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## Effect of Therapeutic Hospital Clown Use on Children's Behavioral Adherence During Burn Dressing Changes

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### Abstract:

**Background:** Burns in children remain an important epidemiological problem. Caring for these particularly vulnerable groups requires a multidisciplinary approach to treating burns and reducing their painful impact on children. **Aim of the study was** to evaluate the effect of therapeutic hospital clown use on children's behavioral adherence during burn dressing changes. **Setting:** Assiut General Hospital out-patient burn clinic. **Subjects and Method:** A quasi-experimental (post-test) research design was used. **The study applied one tool** which included two parts: **Part (I):** Included children's personal and clinical data. **Part (II):** Involved the child's behavioral observational form which involved 8 classifications such as crying, yelling, activity, mood, communication, interaction with the parents, sensitivity to the environment, and attitude to the nurse. **Results:** It was found that 76% and 88% of both study & control group had extremity burn with second degree in 68% and 76% respectively. The study results revealed good adherence to the change of burn dressing in the study group children than those in the control group with a statistically significant relation regarding all domains of the children's adherence (P-Value <0.01). **Conclusion:** Applying therapeutic hospital clown to children in the study group had a better adherence to burn dressing change than those in the control group. **Recommendation:** Therapeutic clowning should be included in the hospitals policies and care plans as a basic intervention care for burned children.

**Keywords:** Burn Dressing, Behavioral Adherence, Children, Therapeutic Hospital Clown.

### Introduction:

Worldwide burn is the main cause of children death and disability. World Health Organization (WHO) reports that burn account for 180,000 deaths each year and is the fifth most leading cause of non-fatal childhood injuries (**World Health Organization, 2018**). Infant burn mortality is more than seven times higher in low- and middle-income countries than in high-income countries, so the burden of infant mortality from burns reflects inequalities in risk factors and care capacity. Causes and treatment of burns in children due to the increased risk of mortality in children with burns, the physical and psychosocial impact on children with burns, and the critical deficit in burn and pediatric care capacity worldwide. sRequires special attention (**Jordan et al., 2022**)

Burns are the most common form of injury in children and adolescents, especially children under the age of five. Childhood burns are a significant problem in Egypt and are therefore one of the most devastating injuries a child can sustain, coupled with long-term aggressive and non-aggressive medical and nursing therapy which can lead to serious physical

and psychological problems, children also experience significant levels of anxiety associated with painful medical procedures such as hospitalization and routine changes of burn dressing (**Kawalec, 2018 and Yildirim et al., 2019**)

The total number of children with burns was 120 children treated in outpatient clinics with burns <10% of body surface area (TBSA), plus 200 children with >10% TBSA burns was being treated in the inpatient ward of Assiut General Hospital. The most common sites of burn in the outpatient group were the upper limb (hands and forearm 30%), lower limb (leg and feet 30%), followed by the face (20%). Scalding was the most common cause in 75% of cases, then 25% for flame (**Statistics retrieved from Assiut General Hospital Medical Records, 2022**).

Management of acute burns in children ranges from simple outpatient care to complex emergency care, critical care, and surgical intervention (**Esparaz et al., 2022**). Numerous approaches are used to for alleviation of pain and anxiety which associated with burns and their care. Distraction is one of the non-pharmacological interventions for pain relief (**Thrane et al., 2016**). The literature has shown that managing

anxiety and related behavioral responses in children is highly affected by the various distraction methods which used during burn treatment (Miller et al., 2011).

In addition to common virtual reality methods, there are the non-pharmacological methods in pain management during wound care which includes multimodal distraction, computer tablet distraction, cartoon animation viewing and kaleidoscope use (Moore et al., 2015). Similarly, for decades therapeutic clowning is another distraction method that has been used in hospitals to distract and entertain children in hospitals and is widely used to reduce stress and anxiety (Muthuguruvu, 2016).

Clown therapy is a new phenomenon, an interdisciplinary art that incorporates various talents such as drama, music, and dance to provide humor-based distraction to improve mood and reduce anxiety in hospitalized patients. Several studies have shown clown therapy to be more efficient than other distraction methods (such as parental attendance or video games) in reducing children anxiety (Catapan et al., 2020). However, there is insufficient scientific evidence regarding the effectiveness of using clown therapy for dressing children who have suffered from burns (Muthuguruvu, 2016).

#### **Background theory**

##### **Landy's on roles: role theory and role method**

In 1993 Landy developed role theory and role method as a framework for drama therapy. Then in 2009 Landy, stated that life is inherently dramatic and dramatic behavior is a central feature of human existence. Landy and Butler (2011) argues that the ability of human to experience and express more roles leads to a dynamic form of balance that can be viewed as sound structural management. Participating in dramatic play can therefore improve ability to support and maintain a healthy role system.

##### **The clown role**

A clown can be defined as a performer whose art is to entertain individuals. Pierrot has been used since 4500 BC (Bala, 2010). On the one hand, clowns are perceived as likable and funny children's heroes."Benevolent figures, true givers of pleasures". Thus, when medical clowns tour hospital wards, they have a middle zone wherever they go and recreate it through their physical presence. . From this standpoint, encouraging patients to become immersed, engaged, or involved in the world as if it were a rapid and natural transition that sets the stage for role expansion and the development of emotional flexibility (Winnicott's 2005).

##### **Significance of the study:**

Burns are often painful, and the pain from severe burns is considered the worst kind of pain. Patients refer to this pain as "living hell" or the deadliest pain

they have ever experienced (Jordan et al., 2022). Childhood burns are a major problem in Egypt, especially among poor families (Hassen et al., 2010). Pain management involves burn surgeons, pediatricians, pain specialists (usually anesthesiologists), nurses, occupational therapists, physical therapists, psychologists, the child's parents/caregivers, and most importantly, therapeutic hospital clown (Lusignani , 2022).

Clown therapy targets to lead children in using these coping approaches to help manage pain caused by anxiety and interventions. Physiological production of beta-endorphin, a substance with potent analgesic and stimulant properties that can organically exert an anesthetic effect similar to morphine and opiates can be stimulated by fun and laugh. Therefore, the application of hospital clown nurses plays an important role in reducing pain and anxiety in children during burn dressing changes and in improving children's behavioral adherence during burn dressing changes (Fusetti et al. 2022).

##### **Aim of the study:**

To evaluate the effect of therapeutic hospital clown use on children's behavioral adherence during burn dressing changes

##### **Research hypotheses:**

**Null Hypothesis:** Application of **therapeutic hospital clown** intervention has no effect on children's behavioral adherence during burn dressing change in the study group the same as those in the control group who are receiving the hospital routine care.

**Alternative Hypothesis:** Children who are applying **therapeutic hospital clown** intervention have a better behavioral adherence during burn dressing change than those in the control group who are getting the hospital routine care.

##### **Subjects and Method:**

###### **Research design:**

A quasi-experimental (post-test) research design was used.

###### **Setting:**

The study was conducted at the Assiut General Hospital out-patient burn clinic which affiliated to Ministry of Health. There were construction and repair works in the burn department at the Assiut University Hospital, so the burn department at Assiut General Hospital was chosen to conduct the study, due to the length of the repairs period. The burn department in Assiut General Hospital is the second place to receive the largest number of burn patients in Assiut Governorate, to provide examination, treatment and follow-up services, as well as regular burn dressing for free.

**Subjects:**

A purposeful represented sample of 50 children undergoing a burn dressing change in the outpatient clinic, total of 25 children in each study and control groups who were brought by their parents for a burn dressing change. They were selected based on the number of children with first and second degree of burn who were visiting the mentioned study setting in which 57 child with first and second degree came to outpatient clinic monthly with the mentioned inclusion criteria, and by using the following equation according to (Steven & Thompson, 2012)

$$n = \frac{N \times P(1-P)}{[N-1 \times (d^2 \div Z^2)] + P(1-p)}$$

N= total number of children with first and second degree of burn.

Z= confidence level is 0.95 and is equal to 1.96

D= the error ratio is = 0.05

P= the property availability ratio and neutral = 0.50

The study children enrolled by applying the following inclusion and exclusion criteria:

- **Inclusion criteria:**

Both sex child who have first degree, second degree or mix type (first and second degree), the burn less than 10% of whole-body surface, aged between 3 and 7years old were enrolled in the current research.

- **Exclusion criteria:**

The child who have facial and/or genital burn injury, third degree burn, burn with more than 10% of whole-body surface, having any physical (e.g., being blind and/or deaf, difficulties in speaking) and/or psychological problem (e.g. autism, agitation) which may affect the child's response to the interventions, being scared of clowns and who refused to participate in the study were excluded.

**Tool of the study: One tool utilized for this study:**

Child's behavioral adherence observational questionnaire. **It included: Part one:** Comprised of 15 questions about the personal and clinical data of the children such as; age, sex, site of burn, type of burn, causes of burn, degree of burn, history of burn, and number of dressing /week. **Part two:** The child's behavioral adherence observational questionnaire: It adopted from a previous study done by **Yildirim et al., (2019)**. It involved 8 classifications such as crying, yelling, activity, mood, communication, interaction with the parents, sensitivity to the environment, and attitude to the nurse (who were observed in children during dressing change).

**Scoring system:**

It was evaluated based on the points of the sheet. Each category was scored from 0 to 2, with 0 representing the best adherence and 2 representing the worst adherence with the overall wound dressing

procedure. High values indicate poor adherence when changing burn dressings.

**Method of data collection:**

- Dean of the Faculty of Nursing validated agreement to the administration of Assiut General Hospital was gained to collect data after the purpose of the study had been clarified.
- **Study tool:** Child's behavioral adherence observational questionnaire tested for its content validity index by five experts in the fields of pediatric and community health nursing and it was 0.83. Also, the internal consistency of reliability for the tool was evaluated by using Cronbach's Alpha test which was 0.95, which showed a high consistency between observations.
- **Ethical approval** acquired from the Ethics Committee of the Assiut University Faculty of Nursing. The purpose and nature of the study were clarified to the children's parents. In addition, the child's parents were told that the acceptance to participate in the study is voluntary.
- **Written agreement** gotten from each parent to participate in the study and informed about the confidentiality of their data and will be used only for the purpose of the study.
- **A pilot study** performed on 10% (5 children) to check the unambiguousness of the tool and to estimate the time required for completing the sheet. There were no modifications, omissions and/or additions were made in the form according to the pilot study results. So, the children in the pilot study were included in the study.
- **Process of application of therapeutic/hospital clown nurse:**

Burn in a child is a traumatic experience and repeated dressing is one of the main problems for these children. Therefore, the goal of this intervention was to improve behavioral adherence during burn dressing changes and to cope with the distress that caused by this procedure, it was applied in four phases:

  - Assessment phase:** The researchers assessed children's personal data such as age, sex, and burn data such as burned body part(s), types, causes, degrees, history and number of dressing /week.
  - Planning phase:** It included the planning for the implementation of the intervention as the preparation of the classic colorful clown costume with a colorful curly wig that include bright yellow, blue, and red colors. The clown face mask was selected carefully to be suitable for both sexes, also selection of clown red hair (see Fig. 1). Children assessed for eligibility during the planned study period according to inclusion and exclusion criteria illustrated before. Randomization included 50 children and was done by

simulating a coin toss and defining 0 as the control group and 1 as the study group.



**Fig. (1):** A photo taken for therapeutic hospital clown.

**-Implementation phase:** This study was carried out at burn out-patient clinic of Assiut General Hospital. A selected nurse was trained in Bahaa El-Din Culture Palace Theater, Assiut for 36 hrs. as a certified practical education for child entertaining activities as a clown. The Application of hospital clown nurse in burn clinic was conducted for four months. For the study group, a clown nurse waited for the child at the entrance of the intervention room and accompanied him from the beginning to the end of dressing. Clowns used distraction methods to create balloons of specific shapes, with curved balloons and other balloons depending on the child's preferred shape and color (e.g. the tendency of boys was a cartoon character-shaped balloons like ben teen, while the girls was used kitty- shaped balloons).

The hospital clown nurse was chatting with the child in accordance with child's tendency (asking him/ her to choose balloon colors, speaking about his/her hobbies and favorite cartoon characters). The behavioral reactions given by the child to the procedure using the child's behavioral observational questionnaire was observed by the other researcher. One nurse was only responsible for being as a clown nurse and the other one was one of the researchers who was always the observer for avoiding inconsistency between applications and observations. The nurse who was applying dressing change was fixed for children in the two groups. During the procedure, the hospital clown nurse was dressed in

the classic colorful clown costume. The same costume was used for every child in the study group. For avoiding the risk of infection in the unit, the clown's costume was washed after every shift. There was no risk of infection from the hospital clown; she didn't touch or interfere in the burned child's care during dressing. Only act as a hospital clown from a near site.

For the children in the control group, there was not a clown-nurse in the dressing room, the same observer observed their behavioral reactions. As a standard care in the control group, the parents were with the child during all the procedure. They were receiving the hospital routine care during dressing change.

**-Evaluation phase:** During this phase, the application of the hospital clown nurse was done only one time during child burn dressing for the study group and the researcher who was observed child reaction and recorded the child behavioral compliance during burn dressing. Also, the child behavioral compliance was recorded during burn dressing by the researcher as an observer.

- **Work field:** The data were collected during seven months; from the 1<sup>st</sup> of May 2022 to the 1<sup>st</sup> of December, 2022. The researchers met children's parents at burn out-patient clinic in Assiut General Hospital. The researchers presented themselves to children's parents and described the rationale and nature of the research during the meeting. The hospital clown nurse and one of researchers accompanying each studied child and his parents to the dressing room in the study group. While only one of researchers accompanying each studied child and his parents to the dressing room in the control group. A bout two child (one in the study and one in the control) was interviewed each day (one time/week). The needed time for completing all items in the form was about 20-30 minutes governed by the child's reaction. Evaluation of child reaction was recorded one time during child burn dressing.
- **Statistical design:** Data analysis was performed using SPSS 20 statistical software. The qualitative variables were described using frequency and percentages. Quantitative variables were described using range and mean  $\pm$  standard deviation. Chi-square and Mcnemar tests were used. P-value  $<0.05$  was considered significant and highly significant if P value  $<0.01$ .

**Results:**

**Table 1**

Percentage distribution of study & control children according to their personal data (n=50)

Children's data	Study (n=25)		Control (n=25)		Total (n=50)		X2	P. value
	No	%	No	%	No	%		
<b>Child's age/ Years:</b>								
From 3-5 years	15	60.0	20	80.0	35	70.0	2.38	0.217
More than 5 years	10	40.0	5	20.0	15	30.0		
Mean± SD	4.92±1.80		4.20±1.52		4.56±1.69		Z=1.37	0.169
<b>Child's sex:</b>								
Male	15	60.0	19	76.0	34	68.0	1.47	0.225
Female	10	40.0	6	24.0	16	32.0		
<b>Burned body part(s):</b>								
Extremity	19	76.0	22	88.0	41	82.0	1.22	0.269
Body	6	24.0	3	12.0	8	16.0		
Face	0	0.0	0	0.0	0	0.0		
Face and Body	0	0.0	0	0.0	0	0.0		
<b>Burn types:</b>								
Scald	23	92.0	25	100.0	48	96.0	2.08	0.149
Contact	2	8.0	0	0.0	2	4.0		
<b>Burn causes:</b>								
Tea	6	24.0	5	20.0	11	22.0	0.61	0.988
Soup	5	20.0	5	20.0	10	20.0		
Stove	2	8.0	1	4.0	3	6.0		
Water	10	40.0	12	48.0	22	44.0		
Iron	1	4.0	1	4.0	2	4.0		
Oil	1	4.0	1	4.0	2	4.0		
<b>Burn degrees:</b>								
1st degree	2	8.0	5	20.0	7	14.0	4.97	0.083
2nd degree	17	68.0	19	76.0	36	72.0		
Mix type (1st and 2nd)	6	24.0	1	4.0	7	14.0		
<b>History of burn:</b>								
Yes	1	4.0	1	4.0	2	4.0	0.00	1.000
No	24	96.0	24	96.0	48	96.0		

Chi square test for qualitative data between the two groups or more

Mann-Whitney Test qualitative data between the two groups (Non Parametric)

\*statistically Significant difference at P. value <0.05 \*\*statistically Significant difference at P. value <0.05

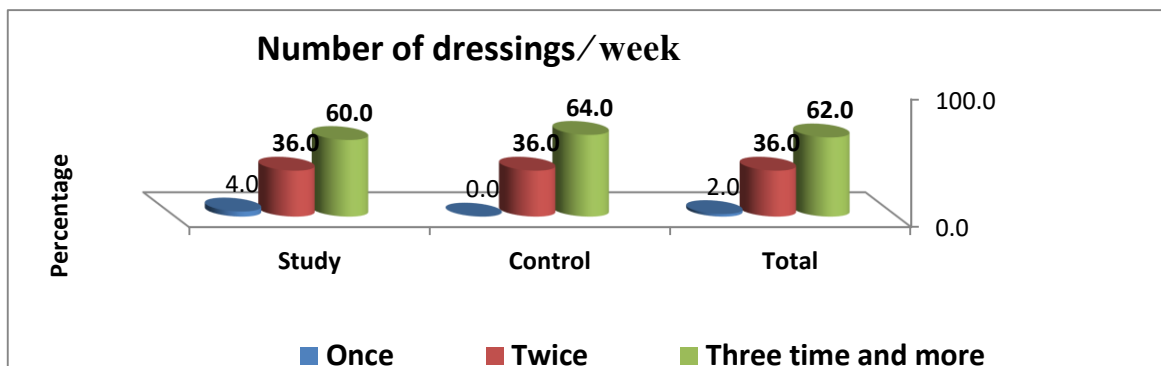


Figure 2: Number of dressings per week in the study & control groups (n=50)

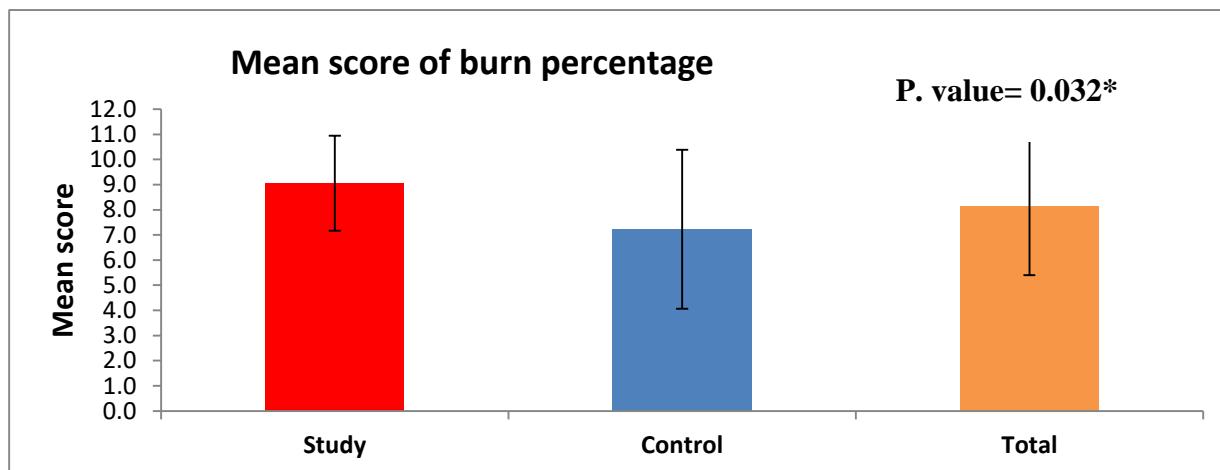


Figure 3: Mean score of burn percentage in the study & control groups (n=50)

Table 2: Mean score of children’s behavioral adherence domains to burn dressing change in the study & control groups (n=50)

Children’s adherence domains	Study		Control		Z	P. value
	Mean ±SD	Range	Mean ±SD	Range		
Crying	0.52±0.59	0-2	1.28±0.54	0-2	-3.997	0.000**
Yelling	0.4±0.58	0-2	0.92±0.64	0-2	-2.866	0.004**
Activity	0.44±0.58	0-2	1.24±0.52	0-2	-4.235	0.000**
Mood	0.68±0.69	0-2	1.28±0.46	1-2	-3.260	0.001**
Communication	0.32±0.69	0-2	1.4±0.5	1-2	-4.914	0.000**
Interaction with the parents	0.88±0.6	0-2	1.6±0.58	0-2	-3.797	0.000**
Sensitivity to the environment	0.64±0.76	0-2	1.24±0.52	0-2	-3.044	0.002**
Attitude to the nurse	0.48±0.77	0-2	1.4±0.58	0-2	-4.037	0.000**

Mann-Whitney Test qualitative data between the two groups (Non Parametric)

\*\*statistically significant difference at P. value <0.05

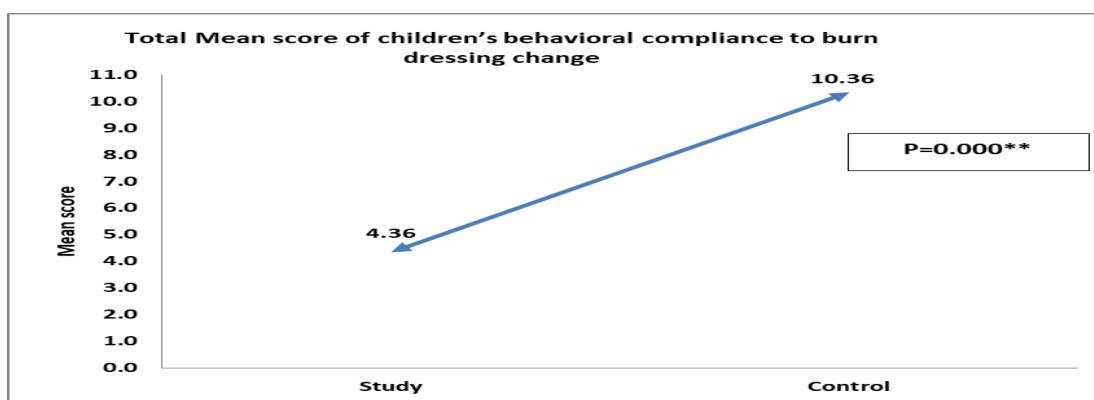


Figure 4: Total Mean score of children’s behavioral adherence to burn dressing change in the study and control groups (n=50)

**Table 3: Correlation Coefficient between children's behavioral adherence to burn dressing change & children's data in the study and control groups (n=50)**

Children's data	Total Burn dressing change			
	Study		Control	
	R	P	r	P
Child's age/ Years	-0.580 <sup>**</sup>	0.002	-0.450 <sup>*</sup>	0.024
Child's sex	-0.086	0.683	0.425 <sup>*</sup>	0.034
Burned body part(s)	0.383	0.059	0.038	0.859
Type of burn	0.475 <sup>*</sup>	0.016	-	-
Causes of burn	0.105	0.617	-0.262	0.205
Degree of burn	-0.102	0.626	0.194	0.353
Burn percentage	-0.084	0.689	0.104	0.621
History of burn	-0.143	0.495	-0.171	0.413
Number of dressings	0.081	0.699	-0.076	0.719

\*statistically Significant Correlations at P. value <0.05

\*\*statistically Significant Correlations at P. value <0.01

### Results:

**Table (1):** Shows that 60.0% and 80.0% of children in the study and control groups respectively their ages ranged from 3-5 years. Also, 60.0% and 76.0% of children in the study and control groups were males. Moreover, 76.0% and 88.0% of children in the two groups respectively had burns on their extremities. Likewise, the most common type of burn was scalded burn injuries in 92.0% of children in the study group compared to 100.0 % in the control group. The leading cause of burn was hot water in 40.0% and 48.0% for the two groups respectively. In addition, 68.0% and 76.0% of the children in the study and control groups had second-degree burns. Only 4.0 % of the children in the two groups had burn history. There was no statistically significant difference concerning children's data in the study and control groups.

**Figure (2):** Reveals that 60.0 % and 64.0% of children in the study and control groups respectively dressed three times and more per week. With no statistically significant difference was found between the two groups.

**Figure (3):** Shows the Mean score of burn percentage; it was  $9.06 \pm 1.89$  and  $7.22 \pm 3.16$  for the study and the control groups respectively with a total mean  $\pm$  SD was  $8.14 \pm 2.74$ . There was a statistically significant difference (P-value =0.032) was found between the two groups.

**Table (2):** Illustrates that the children in the study group exhibited better behavioral compliance dominates to burn dressing change than those children in the control group with a statistically significant difference regarding all variables of the children's adherence.

**Figure (4):** Indicates that the total mean score was 4.36 and 10.36 for the study and control groups respectively with a highly statistically significant difference (P-value = 0.000).

**Table (3):** Demonstrates that there was a statistically negative correlation between children's age and their adherence in the study and the control groups ( $r = -0.580^{**}$ ,  $P = 0.002$  and  $r = -0.450^{*}$ ,  $p = 0.024$ ) respectively. While there was a statistically positive correlation between children's adherence and sex ( $r = 0.425^{*}$ ,  $P = 0.034$ ) in the control group.

### Discussion

Therapeutic clowns are "introduced in hospitals around the world to stimulate wellness and improve the physical and mental health and quality of life of patients, their families, and the health care workers. Medical clowns tour hospital wards, bring joy and humor to hospitals, and accompany patients through sometimes terrifying medical procedures.

The current study aimed to evaluate the **effect of therapeutic hospital clown use on children's behavioral adherence during burn dressing changes.**

Regarding personal data, there were no statistically significant differences between the study and control groups. This result appeared to be consistent with a study by **Kaheni et al. (2016)** who studied the effect of distraction technique on the pain of dressing change among 3–6 year-old children pointed out that age, sex, and burn rates in children were not significant between study and control groups.

The results of the present study showed that the extremities were the common burn site for the majority of children in both groups. In dissimilarity, **Jordan et al. (2022)** carried out study entitled "Global trends in pediatric burn injuries and care capacity from the World Health Organization Global Burn Registry' found that the torso is the most injured body region.

In addition, the results found that the most common type of burn was scalded burn in the majority of

children in both groups. This is proved by records of **Assiut General Hospital, (2022)** which recorded scalding as the most common cause of burn in children then flame. Study done by **Jordan et al., (2022)** showed that most children's burn was scald followed by flame burn. Also, this is consistent with **Hassen et al., (2010)** who carried out study in Upper Egypt about experience in management of paediatric burn revealed that scalds were the most common cause of burn among pediatric population, particularly among children less than 5 years of age. Likewise, the results revealed that one of the leading causes of burn was hot water in both groups. This can be explained by the researchers as children are exposed to hot water more than other causes of burn that around two-thirds of the children in the study and control groups need dressing change three times and more per week with no statistically significant difference found between the two groups. These can be interpreted that children needing frequent wound care to facilitate rapid healing of burn and reduce the occurrence of infection.

The current study illustrated that the children in the study group exhibited better behavioral compliance to burn dressing change than those in the control group with a statistically significant difference regarding all variables of the children's behavioral compliance. This is interpreted as a hospital clown nurse is often seen as the one in charge of introducing some laughter into an unhappy setting. On the one hand, the clowns help distract children, even if only momentarily, from the unpleasant situation in which they find themselves and they try to improve the quality of life of the hospital and its staff through the introduction of humor and comic relief. These results are in the same line with **Markova et al., (2021)** who carried out a study to evaluate the positive effects of a healthcare clown intervention on children undergoing surgery" reported that a healthcare clown intervention has some positive effects on the behaviors and moods of hospitalized children and their parents, which could further lead to more compliance and faster recovery.

At the same time, this result appears in agreement with **Tener et al., (2016)** who studied the medical clowning interaction with children undergoing invasive examinations in hospitals observed that the children who were accompanied by a clown were happier and calmer than children in the control group. Also, in line with **Alcântara et al., (2016)** who assessed the medical clowning interaction with children undergoing invasive examinations in hospitals stated that the playful interaction of children with clowns was an effective strategy for redirecting the energy of children to positive and beneficial feelings. The non-verbal behavioral changes during

because of the daily use of water in drinking, cooking, and cleaning.

Moreover, the current study proved that more than two-thirds of the study group and more than three-quarters of the control group had second-degree burn and the majority of children in both groups didn't have a history of burn. These results agreed with **Yildirim, et al., (2019)** who performed study about the effect of hospital clown nurse on children's compliance to burn dressing change reported that high percentage of children in the study and control groups had second-degree burns. Also, large numbers of the studied children did not have history of burn.

The findings of the current study represent

the intervention showed that children become more relaxed, attentive, and smiley. The achievement of distraction in pediatric burns is shown in many scientific studies as a study done by **Kaheni et al., (2016)** who used the distraction method and reported less pain during burn dressing change.

Moreover, this finding is consistent with **Yun et al., (2015)** who conducted a research in South Korea about the effects of a clown-nurse educational intervention on the reduction of postoperative anxiety and pain among preschool children and their accompanying parents mentioned that the findings related to hospital clowns for the management of different hospital experiences among children show positive outcomes such as crying less, being less anxious and experiencing less pain.

Also, these findings are in accordance with **Moore et al., (2015)** who evaluated the effect of directed medical play on young children's pain and distress during burn wound care and united distraction with reported less distress among children who joined the intervention. Also, is congruent with **Nilsson et al., (2013)** who performed a study to compare between active and passive distraction in children undergoing wound dressings and **Sil et al., (2012)** who carried out a case control study about videogame distraction reduces behavioral distress in a preschool-aged child undergoing repeated burn dressing changes.

Also, the results showed that the total mean score of children's behavioral adherence to burn dressing change was low in the study group compared to the control group with a highly statistically significant difference. The results agreed with a study done by **Markova et al., (2021)** who showed that children in the study group vocalized more positively than children in the control group during the waiting, premedication, and bed manipulation phase and showed more positive emotions than children in the control group during premedication. Also, the findings are in congruent with **Könsgen et al., (2019)** who conducted a systemic review and meta-analysis



on clowning in children undergoing potentially anxiety-provoking procedures and **Fusetti et al., (2022)** who studied clown therapy for procedural pain in children and **Krieger et al., (2022)** who carried out study entitled "relieving pain and distress symptoms in the outpatient burn clinic: The contribution of a medical clown" mentioned that clown therapy is useful for managing anxiety, procedural pain and emotional distress. Fun and laughter physiologically stimulate the production of beta-endorphins, substances with powerful analgesic and stimulating properties capable of organically exerting an anesthetizing effect similar to morphine and opiates. The present study clarified that there was a statistically negative correlation between children's age and behavioral adherence in the study and the control groups. These can be interpreted by the older children' brains as mature enough than younger children, so they are charmed by colorful costumes, bright red hair, balloons, dancing, and funny movements done by clowns that distract their attention from feeling of a pain to be occupied with beautiful character and colors. These results are synchronized with **Yildirim et al., (2019)** who illustrated that there was a negative correlation between age and children's behavioral compliance in the study group in other words; older children had better compliance to burn dressing change. These findings are inconsistent with **Wolyniez et al., (2013)** who reported that younger children had less score of pain in the presence of the medical clown. The proposed study found that there was a statistically positive correlation between children's behavioral adherence and type of burn in the study group also, between children's behavioral adherence and sex in the control group. It can be explained by when the type of burn has less severity and pain this helps the child to interact and respond to the clown than children who have serious types of burn.

#### Conclusion:

The burned studied children experience cumulative benefits from therapeutic hospital clowning in terms of better behavioral adherence to burn dressing change.

#### Recommendations:

1. Health education program targets the healthcare professionals about the importance of behavioral effects associated with burn and the various non-pharmacological alternatives such as therapeutic hospital clowning to gain certifications for promotion of the psychological wellbeing of burned children.
2. Therapeutic hospital clowning and other methods of behavioral adherence and distraction strategies

should be included in the hospitals policies and care plans as a basic intervention care for burned children.

3. Further researches on larger sample size are essential for generalization of the result

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