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The effect of hospital clown nurse on children's compliance to burn dressing change

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ABSTRACT

Background and aim: Pediatric burn injury is a traumatic experience which affects the child both physically and psychologically. Following the burn injury, repetitive dressing changes are one of the main problems, and to manage the level of distress caused this procedure, various distraction strategies are being used. However, the effect of hospital clown during burn dressing change among children has not been studied before. Therefore, the present study aimed to investigate the effect of hospital clown-nurse on children's compliance to burn dressing change.

Methods: This randomized controlled experimental study was conducted with 50 children between 3-7 years. There were 25 children in the experimental group and 25 children in the control group. In the intervention group, clown-nurse accompanied the child during burn dressing change while the children in the control group received standard care without hospital clown. Children's behavioral reactions were observed during dressing change.

Conclusions: Children in the intervention group had better compliance to burn dressing change, in other words, they cried and/or yelled less, they were more active, had better mood, better communication and interaction with the accompanying parent and the nurse. In addition, older children in the experimental group had better compliance to the burn dressing change.

1. Introduction

Burn is a traumatic experience for children in many aspects. Especially the emotional dimension of this experience should not be overlooked. Besides the physical trauma of the burn injury, children also experience a significant level of anxiety related to hospitalization and painful medical procedures such as regular burn dressing changes [1]. These

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experiences may have long-term negative effects such as problems in sleeping and eating, decrease in cooperative behaviors, and post-traumatic stress [2]. Therefore, various strategies are being used to reduce pain and anxiety related to burn injuries and its care. In the literature, it can be seen that during burn wound care, the usage of different distraction methods is shown to be very effective on the management of anxiety and related behavioral responses among children [3–7]. Besides the commonly used virtual reality methods, other distraction strategies such as multimodal distraction, directed medical play, distraction with computer tablets, showing cartoon animations, and usage of kaleidoscope are recommended non-pharmacological methods in pain management during wound care [2,4,8]. On the other hand, therapeutic clowning is another distraction method that has been used in hospitals for decades for distracting and entertaining hospitalized children [9–12]. In the near literature, it was commonly used for the management of pain and reduction of stress and anxiety during medical procedures [13–20]. However, there are not enough scientific findings about the efficiency of using therapeutic clowning during dressing changes of children with burn injuries. Therefore, the purpose of the present study was to investigate the effect of hospital clown nurse on children's compliance to burn dressing change in various aspects such as behavioral responses, mood, communication and interaction with the parent and the nurse.

2. Methods

2.1. Study design and setting

This randomized controlled experimental study was conducted in the burn unit of an education and research hospital in Istanbul, Turkey between 14th of May and 1st of June 2015.

2.2. Sampling and randomization

The sample consisted of 50 children undergoing a burn dressing change in the outpatient burn unit. There were 25 children in the intervention group and 25 children in the control group who were brought by their parents for their first or repetitive burn dressing change. Each child only participated one-time in the study. Children included in the study were between 3 and 7 years old (mean age 4.54 ±1.23 years), had first-degree, second-degree or mix type (first and second-degree) burn less than 10% of whole body surface. The age group was defined as 3–7 years old, in accordance with the findings of Linge which suggests that the age of the child plays a great role in the interaction between the child and the hospital clown [21]. In addition, parental inclusion criteria were having written permission from the accompanying parent for child's participation in the study and having an accompanying parent during all the procedure of dressing change. Children with following criteria were not included in the study: (a) having facial and/or genital burn injury, (b) having third degree burn, (c) having a burn with more than 10% of whole body surface (*the children with the conditions a, b or c was being treated in the inpatient clinic according to the hospital's regulations*), (d) having any physical (*e.g. being blind and/or deaf, having difficulties in speaking*) and/or psychological problem (*e.g. autism, agitation*) which may affect child's response to the interventions, and (e) being scared of clowns.

In total, sixty-three children were assessed for eligibility during the planned study period, and 2 children excluded for having burn injury in genitals while one child excluded for his difficulty in speaking. Randomization started with 60 children and was done by creating a random number list in Microsoft Office Excel computer program simulating a coin toss and defining 0 as the control group and 1 as the intervention group, subsequently following a simple sequential randomization, children were assigned to one of two study groups using a coin toss simulation. According to the randomization data, intervention group included 32 children and control group included 28 children who were eligible for sampling criteria. The study completed with 25 children in each group due to exclusion of seven children in the experimental group and three children in the control group due to various reasons explained in the CONSORT E-Flow chart (see Fig. 1).

2.3. Intervention (clown-nurse)

For the intervention group, there was a clown-nurse waiting for the child in the entrance of the intervention room and accompanied the child from the beginning to the end of dressing change. The clown used the distraction methods of making certain shaped balloons by using twisty balloons and facial painting according to child's preference of shape and colors (*e.g. the tendency of boys were sword or dog-shaped balloons and facial painting of superheroes while the girls mostly asked butterfly-shaped balloons and facial painting of a cat*), and chatting with the child in accordance with child's tendency (*asking him/her to choose the facial painting and balloon colors, speaking about his/her hobbies and favorite cartoon characters*). Meanwhile, one researcher observed the behavioral reactions given by the child to the procedure using the Child Observation Form (see Table 1). For avoiding inconsistency between applications and observations, one researcher was only responsible for being the clown, one researcher was always the observer and one researcher was always doing the dressing change. Beforehand, clown-nurse had 20h of certified practical education for certain child entertaining activities as a clown. During the procedure, the clown was dressed in the classic colorful clown costume with a colorful curly wig and she was wearing a red clown nose with facial painting (see Fig. 3). The same costume was used for every child in the intervention group. For avoiding the risk of infection in the unit, the clown's costume was washed after every shift.

For the children in the control group, there was not a clown-nurse in the dressing room, the same researcher changed their dressings and the same observer observed their behavioral reactions. As a standard care in the control group, the parent was with the child during all the procedure and the nurse who was changing the dressing was trying to communicate with the child for distraction in accordance with child's tendency (*asking about his/her hobbies, favorite cartoon characters, games he/she likes to play with his/her friends*).

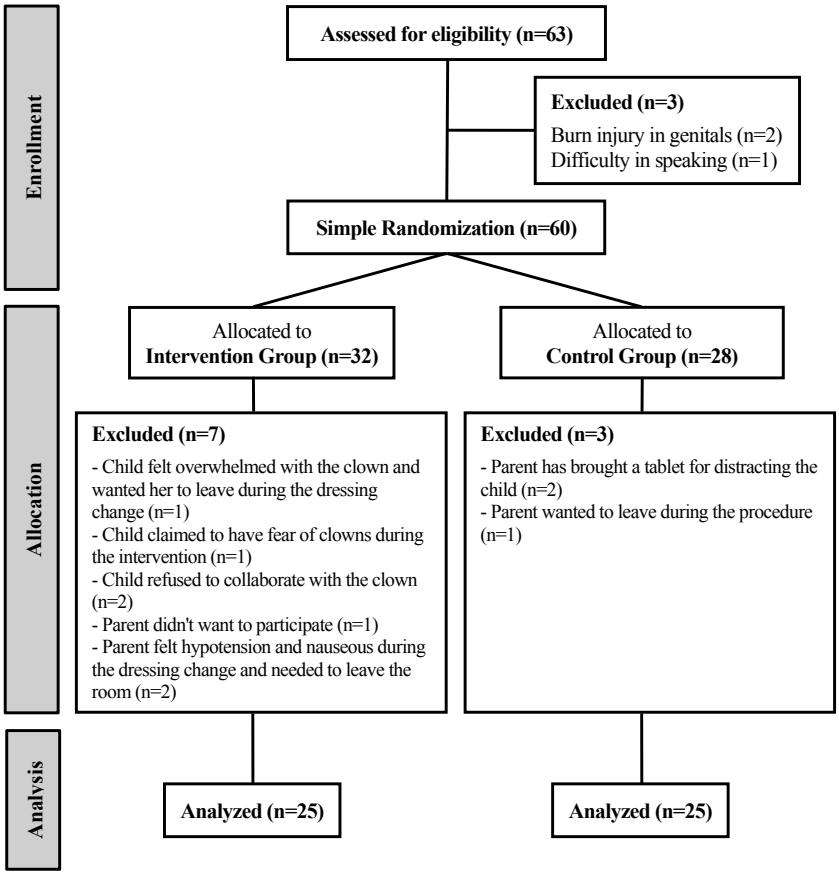

Fig. 1 – CONSORT E-Flow chart.

2.4. *Data collection*

The data were collected by a questionnaire and Child Observation Form, which were created by the researchers in accordance with the related literature [13,14,22]. The questionnaire included 15 questions about the socio-demographic characteristics of the child, his/her burn history and hospital experiences. Percentage of the burn was calculated by Lund and Browder chart [23]. In addition, the Child Observation Form (see Table 1) was created by the researchers in parallel to the study design and included 8 categories which are crying, yelling, activity, mood, communication, interaction with the parent, sensitivity to the environment, and attitude to the nurse (who were changing the dressing). Each category was scored from zero to two, which zero means best compliance while two shows the worst compliance to the whole procedure of burn dressing

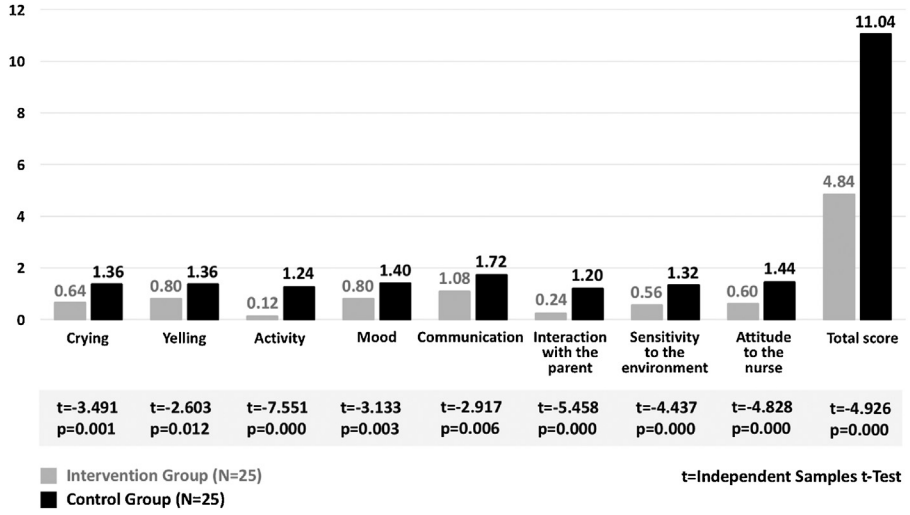

Fig. 2 – Children's compliance to burn dressing change in both groups.

Table 1 – Child Observation Form during burn dressing change.

During all the procedure of burn dressing change, the child...		
Crying		
0	Never cried	O
1	Cried intermittently	O
2	Cried continuously	O
Yelling		
0	Never yelled	O
1	Yelled and groaned intermittently	O
2	Yelled continuously	O
Activity		
0	Stayed calm, was independent from the parent (no tendency to stand in the lap)	O
1	Was anxious, dependent on the parent (was sidling up to the parent, had tendency to stand in the lap)	O
2	Was tending to escape from the room, needed to be tighten to maintain the procedure	O
Mood		
0	Seemed happy, relaxed and was smiling/laughing	O
1	Had no specific mimic, had a neutral facial expression	O
2	Was anxious, frightened, and ready to cry	O
Communication		
0	Was asking questions, responding to questions that were asked, smiling/laughing	O
1	Was answering by shaking his/her head, and speaking shyly when asked questions	O
2	Was neither talking, nor answering to any question	O
Interaction with the parent		
0	Was not dependent on the parent	O
1	Was making an eye contact with the parent, seeming dependent and was sidling up to the parent	O
2	Was hugging the parent tightly and trying to avoid being far from his/her parent	O
Sensitivity to the environment		
0	With his/her looks, was calmly examining the room and the individuals in it	O
1	With his/her looks, was anxiously examining the room and the individuals in it	O
2	Was avoiding looking at the environment and had tendency to get away from the room	O
Attitude to the nurse		
0	Was following the nurse with calm looks, seeming interested	O
1	Was watching the nurse with anxious looks	O
2	Became agitated and started to crying after seeing the nurse, had tendency to get away from the room	O

change. In total, the high scores obtained from the Child Observation Form showed bad compliance to the burn dressing change. Internal consistency *(Chronbach's Alpha value)* of the Child Observation Form was found 0.95, which shows high a consistency between observations.

2.5. *Statistical analysis*

The data were analyzed by using SPSS 21.0 package program. Distribution of socio-demographic characteristics was evaluated by descriptive statistics (mean, standard deviation, frequency). The homogeneity between groups was evaluated by Chi-square test. Mean differences between groups were analyzed by using independent samples t-test for each category of Child Observation Form. The effect of certain factors on children's compliance to the procedure evaluated with linear regression analysis. The correlation between Child Observation Form scores and numerical variables such as age and burn percentage was analyzed by Pearson's Correlation Analysis. P value was considered as significant when it was below the level of 0.05.

Fig. 3 – Clown nurse.

2.6. *Ethical aspect of the study*

The study was conducted in accordance with the World Medical Association's Declaration of Helsinki. Ethical permission and research permits were obtained from the ethical committee of the study hospital on March 26, 2015 *(Registration Number: 89513307/1009/434)*. Written informed consent was obtained from the parent and the child's voluntary participation was considered, and all participants were guaranteed anonymity using the following plan: every informed consent form had a 2-digit code. After the parent signs the consent form, the researcher wrote its code over the data collection form. Therefore, the participants were anonymous for nurse who was collecting the data from the parent and the child.

3. Results

3.1. *Sociodemographic and burn related characteristics*

All sociodemographic and burn-related characteristics such as age, gender, burned body part(s), type of burn, cause of burn, burn degree, burn percentage, and history of burn were distributed homogeneously in both groups, except the number of burn dressing which was slightly more in the control group. Eighty-two percent of all children had burn on their extremities. The most common type of burn was scald burn injuries (90%), and mainly (64%) caused by hot tea. Second-degree burns were the most common (84%) injury. Only 10% of the entire sample has burned before (see Table 2).

3.2. *Children's compliance to burn dressing change*

According to the observations that have been realized during the burn dressing change, the children in the intervention group showed better compliance to the burn dressing change than the ones in the control group by showing less behavioral responses such as crying ($p<0.01$), yelling ($p<0.05$), activity ($p<0.001$), mood ($p<0.01$), communication ($p<0.01$), interaction with the parent ($p<0.001$), sensitivity to the environment ($p<0.001$), and attitude to the nurse ($p<0.001$). In addition, between the intervention and the control group, the total score obtained from the Child Observation Form was significantly lower in the intervention group *(Intervention Group: 4.84–Control Group: 11.04)* which indicates better compliance to burn dressing change ($p<0.001$) (see Fig. 2).

For controlling the factors that may have a role on children's compliance to burn dressing change in both groups; sociodemographic and burn-related characteristics of children were investigated with linear regression analysis, and it was found that any of these factors were explaining the change in children's compliance to the procedure. Only in the

Table 2 – Sociodemographic and burn characteristics of children in both groups.

Characteristics	Experimental group (N=25)		Control group (N=25)		Total (N=50)		Homogeneity of variances
	n	%	n	%	n	%	
Age							
3 years	6	24.0	9	36.0	15	30.0	X^2=4.510
4 years	6	24.0	7	28.0	13	26.0	p=0.341
5 years	3	12.0	5	20.0	8	16.0	
6 years	8	32.0	4	16.0	12	24.0	
7 years	2	8.0	–	–	2	4.0	
Total	25	100.0	25	100.0	50	100.0	
Gender							
Female	15	60.0	12	48.2	27	54.0	X^2=0.725
Male	10	40.0	13	52.0	23	46.0	p=0.395
Total	25	100.0	25	100.0	50	100.0	
Burned body part(s)							
Extremity	24	80.0	21	84.0	41	82.0	X^2=3.824
Body	4	16.0	1	4.0	5	10.0	p=0.281
Face	1	4.0	1	4.0	2	4.0	
Face and Body	–	–	2	8.0	2	4.0	
Total	25	100.0	25	100.0	50	100.0	
Type of burn							
Scald	23	92.0	22	88.0	45	90.0	X^2=0.222
Contact	2	8.0	3	12.0	5	10.0	p=0.637
Total	25	100.0	25	100.0	50	100.0	
Cause of burn							
Tea	17	68.0	15	60.0	32	64.0	X^2=3.236
Soup	1	4.0	1	4.0	2	4.0	p=0.779
Stove	1	4.0	–	–	1	2.0	
Water	4	10.0	5	20.0	9	18.0	
Saucepan	1	4.0	1	4.0	2	4.0	
Iron	–	–	2	8.0	2	4.0	
Oil	1	4.0	1	4.0	2	4.0	
Total	25	100.0	25	100.0	50	100.0	
Burn degree							
1st degree	2	8.0	2	8.0	4	8.0	X^2=1.095
2nd degree	22	88.0	20	80.0	42	84.0	p=0.578
Mix type (1st and 2nd)	1	4.0	3	12.0	4	8.0	
Total	25	100.0	25	100.0	50	100.0	
Burn percentage	5.01±3.24 min:1.5, max:10		4.33±2.90 min:1.5, max:10		4.67±3.06 min:1.5, max:10		F=2.445 p=0.124
History of burn							
Yes	3	12.0	2	8.0	5	10.0	X^2=0.222
No	22	88.0	23	92.0	45	90.0	p=0.637
Total	25	100.0	25	100.0	50	100.0	
Number of dressings	2.96±1.64 min:1, max:8		2.56±0.87 min:1, max:8		2.76±1.31 min:1, max:8		F=2.849 p=0.035*

X^2=Chi-square test for the homogeneity of variances; F=Levene momogenity of variances test.
* $p<0.05$.

experimental group, the age factor explained 24.4% of child's compliance to burn dressing change (Adjusted R^2=0.244, p=0.007) (see Table 3). In parallel with this information, among the experimental group there was a negative correlation between age and children's compliance (r=−0.514; p=0.009), in other words, older children had better compliance to burn dressing change.

4. Discussion

Burn is a negative experience for children both in physical and psychological perspectives. Physically, the children with burn injuries are mostly preoccupied with painful and repetitive dressing changes; on the other hand, psychologically, from the

Table 3 – Regression analysis to determine the factors affecting children's compliance to burn dressing change.

Characteristics	Experimental group (N=25)							Control group (N=25)						
	B	SE	β	R^2	Adjusted R^2	95% CI	t	p	B	SE	β	R^2	Adjusted R^2	95% CI	t	p
Age	−1.884	0.549	−0.604	0.276	**0.244**	−3.049, −0.719	−2.959	**0.007***	−1.472	0.931	−0.351	0.134	0.097	−3.445, 0.501	−1.889	0.071
Gender	2.237	2.067	0.263	0.061	0.020	−2.144, 6.619	1.223	0.234	3.761	2.253	0.413	0.106	0.067	−1.027, 8.549	1.650	0.112
Burned body part	−2.062	1.759	−0.254	0.043	0.001	−5.791, 1.666	−1.015	0.321	−0.771	1.613	−0.151	0.003	−0.041	−4.190, 2.648	−0.255	0.801
Type of burn	0.684	1.153	0.134	0.035	−0.006	−1.761, 3.128	0.920	0.367	1.310	1.518	0.281	0.025	−0.017	−1.909, 4.528	0.773	0.447
Cause of burn	0.626	0.513	0.248	0.130	0.093	−0.463, 1.714	1.857	0.076	−0.537	0.773	−0.232	0.003	−0.041	−2.175, 1.101	0.249	0.806
Burn degree	0.017	2.343	0.001	0.027	−0.016	−4.949, 4.983	0.793	0.436	−0.383	2.843	−0.038	0.019	−0.024	−6.410, 5.643	0.665	0.512
Burn percentage	0.274	0.323	0.209	0.040	-0.001	−0.410, 0.957	−0.984	0.335	0.306	0.567	0.191	0.000	−0.043	−0.896, 1.507	0.017	0.986
History of burn	2.694	2.511	0.210	0.049	0.008	−2.630, 8.018	1.094	0.285	1.551	4.084	0.093	0.001	−0.043	−7.106, 10.208	−0.143	0.887
Number of dressings	−0.541	0.527	−0.210	0.044	0,002	−1.631, 0.548	−1.028	0.315	1.070	1.090	0.201	0.040	−0.001	−1.184, 3.325	0.982	0.336

SE: standard error, CI: confidence interval (lower bound, upper bound).

moment of traumatic injury till the recovery, the whole process of wound care may cause post-traumatic stress symptoms, eating and sleeping disturbances [1,2]. Therefore, there are many studies conducted to investigate various distraction methods such as virtual reality, video games, tablets, cartoon videos, medical play to alleviate the negative effects of the burn injury experience among children [2–7,24–26]. On the other hand, there is a way to reduce the negative impact of painful interventions in children by incorporating humor into distraction, which is therapeutic clowning. However, the studies related to therapeutic clowning are mostly focused on preoperative anxiety and procedural pain [11,12,16–20,27–29]. Therefore, this is the first published randomized controlled clinical trial to our knowledge reporting the effects of therapeutic clowning on children's compliance to burn dressing change.

The success of distraction in pediatric burns is showed in many scientific studies. Sil et al. used videogame distraction and reported reduced behavioral stress during repetitive burn dressing changes [30], while Burns-Nader et al. reported less anxiety during hydrotherapy [24]. In addition, Nilsson et al. compared the effect of serious computer gaming and lollipop with a control group and found lower observed behavioral pain in the children who played computer game during burn dressing change [31]. Similarly, Kaheni et al. used video games in computers and reported less pain during burn dressing change [32]. Moore et al. combined distraction with education doing medical play and reported less distress among the children who joined to medical play [2]. Besides the video-games and plays, virtual reality is another commonly used method for distraction of children with burn injuries. Mott et al. and Hua et al. used virtual reality to distract children during wound dressing change and reported positive effect on analgesic needs and pain relief [5,33].

Despite the fact that there is not any study related to therapeutic clowning during burn dressing changes, the findings related to hospital clowns for the management of different hospital experiences among children show positive outcomes such as crying less [15], being less anxious [13,14,20,28] experiencing less pain [19,20]. In the present study, the children in the intervention group cried less, were calmer, had better mood and better communication than the children in the control group. Dionigi et al. reported that the children who were accompanied by a clown were happier and calmer than the children in the control group [13]. In the qualitative study of Tener et al. clown therapy was used during invasive examination and one of the parents stated that her daughter hardly spoke till she saw the clown, and later she started to smile and laugh [18]. Alcântara et al. investigated the effect of clown interaction in hospitalized children and reported that after the interaction, the children were more relaxed, open, and smiley [17]. In addition to therapeutic clowning, Das et al. studied the distraction by virtual reality during burn dressing change and the parents reported that the children were a lot calmer, much happier and was smiling while playing the game during the procedure [3].

In the present study, the factors which may affect the compliance to burn dressing change were studied for testing the possible accompanying factors in the effectiveness of therapeutic clowning. It was found that only in the

experimental group, older children had better compliance to burn dressing change. Wolyniez et al. investigated the effect of medical clown during intravenous interventions among children 3–16 years old and reported that younger children had lower pain scores when the medical clown was present [19]. It can be said that older children could interact more openly with the clown. On the other hand, in the study of Kjaersgaars-Hansen et al. a female clown was used and girls were found to have a shorter period of crying when the clown was present [15]. In the present study, the clown nurse was female but dressed in a unisex clown costume. In addition, it should be noted that children in each gender may have different preferences and these preferences influence the effectiveness of distraction techniques [34]. In the present study, the preferences of the children were asked for selecting materials, colors, and distraction plays; and there was not any significant difference according to the gender of the child.

In this study, one child felt overwhelmed with the clown, two children refused to collaborate with the clown, while one child claimed to have fear of clowns although it was asked to the child and to the parent when they were invited to the study. Clowns can be perceived as funny and entertaining but also as frightening [35]. Fear of clowns *(coulrophobia)* is not very common among children; however due to their loud clothing and make-up or due to previous traumatic experiences, the children may have fear of clowns. Therefore, in therapeutic clowning, it is recommended to have minimal clothing and make-up accompanied by a red-nose [36]. In a qualitative phenomenological study conducted in Finland, the parents were interviewed about their and their children's experiences with hospital clowns, and it was reported that the initial contact with the clown caused fear and anxiety on the child; however, in the following visits, children get accustomed and liked the hospital clowns [37]. Fear of clowns is an easy-to-control barrier in therapeutic clowning which can be prevented with modifications of clothing and make-up. In the present study, the costume of clown could have a significant role in the exclusion of 4 children due to coulrophobia.

To our knowledge, this is the first published randomized controlled clinical trial for therapeutic clowning among children with burn injuries; as well as the first study which evaluated child's behavioral compliance to the burn dressing change. For the point of view of the injured child, dressing changes are frightening and intriguing at the same time, for this reason, the child is highly focused on the burned body part during all the procedure. Therefore, the use of an effective distraction method is a must for a better medical experience and better compliance to the procedure. According to the positive results obtained from this study, it can be said that therapeutic clowning and giving the child to choose his/her distraction materials are very effective for assuring a positive behavioral compliance to burn dressing change. The results of this study suggest an important evidence for providing a better wound care in pediatric outpatient burn units in comparison with the absence of any distraction method; however, more research is necessary to know the efficacy of this method in pediatric inpatient burn clinics. As a consequence, it can be suggested that the nurses in burn units should be certified for therapeutic clowning or hospital managements should consider having certified clown(s) in the pediatric burn units. This will ensure continuous anxiety control in repetitive dressing changes and prevent negative experiences related to medical interventions.

4.1. *Limitations of the study*

Four children were excluded from the study due to fear of clowns, being overwhelmed with the clown, and refusing to collaborate with the clown. This fact demonstrates that hospital clowns may not be tolerated by all children and it should be considered as a limitation in the application of this distraction method.

On the other hand, as the present study was performed one-time per patient, the results are limited to this experience, therefore the effect of repeated exposure to therapeutic clowning could not be demonstrated. According to this limitation, it is suggested to conduct research studies to investigate the continuous effect of therapeutic clowning during repetitive burn dressing changes.

Conflict of interest

None.

Authors' contribution

- Planning the study design: MY, EK, SK.
- Data collection process: Randomization (MY, SK), clown nurse (EK), observation (CY).
- Statistical analysis: MY, SS.
- Writing the research paper: MY.

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