

Effect of Virtual Reality Technology on Pain during Dressing Change among Children with Burn injuries

Fatma, A. Abd Elrazek¹, Ghada , A.Hassan²

^{1&2} Lecturer of Pediatric Nursing, Faculty of Nursing, Menoufia University, Egypt

Corresponding Author: Fatma, A. Abd Elrazek

Abstract: Background: Virtual reality technology is often used to distract child attention during dressing change in order to minimize pain in pediatric burn patients. Therefore, the purpose of this study was to examine the effect of virtual reality technology on pain during dressing change among children with burn injuries. **Research design:** A Quasi-experimental design was utilized for this study (study/control group). The study was conducted in the burn care department and outpatient plastic surgery clinic at El- Menoufia University Hospital and in the pediatric burn unit at Benha Teaching Hospitals - Benha City, Egypt. A Purposive sample of 60 children from both settings was divided randomly and assigned into two groups (30 in the control group and 30 in the study group). Five tools were used for data collection. Tool one: Demographic characteristics of studied children, Tool two: Wong- Baker FACES pain rating scale, Tool three: face, legs, activity, cry and consolability (FLACC) behavioral pain assessment scale, Tool Four: Visual analogue scale, Tool five: Children Physiological measurements. **The results** of this study showed that 63.4% of children in the virtual reality group did not have pain and 33.3% had only mild pain during dressing change compared to 10% in the control group had only mild pain. In addition, the duration time during dressing change reduced in the virtual reality group to 12.77 ± 4.25 compared to 19.1 ± 4.5 in the control group. Therefore, there were statistical significant differences between the two groups. **Conclusions:** The study concluded that children with burn injuries who used virtual reality technology had less pain, less duration time and their baseline data returned to normal during dressing change than those in the control group. Therefore, this study recommended that virtual reality distraction method should be integrated as a part of routine pain management during dressing change for children with burn injuries.

Keywords: Virtual reality technology, Pain, children with Burn injuries

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I. Introduction

Burn considers as a one of the most traumatic injuries of childhood. The children who suffer from burn injuries has physical injury and emotional trauma due to hospitalization, Also, medical procedures such as wound debridement, dressing changes, physical therapy and removal of skin graft staples consider the most common cause of severe pain and psychological trauma¹. Burn considers the 5th common type of non-fatal injuries in children and the 11 leading cause of death from 1 to 9 years².

Pain is an unpleasant sensory and emotional experience associated with actual and or potential tissue damage³. The management of pain in childhood involves both pharmacological and non-pharmacological interventions³. One type of non-pharmacological pain management for pediatric burn patients is distraction. Distraction is a type of technique in which the attention of children is focused away from medical procedures, pain or thoughts of pain/distress to a more neutral stimulus⁴.

Distraction include active and passive distraction. The active distraction promotes a child's involvement through engaging him/her in an activity during the procedure such as video games to stimulate audio-visual and tactile senses. Guided imagery is another cognitive behavioral technique that used to help children achieve a state of relaxation. Passive distraction involves the child observing a stimulus rather than directly participating in an activity such as audio-visual (listening to music & watching television or videos)⁵. Distracting activities such as bubbles, music and video goggles are the most popular way to decrease distress and pain in children undergoing medical procedures. Computer tablet which includes movies, music, interactive games, books & puzzles is one of the most popular technology based distraction for children⁶.

Virtual Reality considered as a one of the most important emerging technologies that help children to distract their attention specially those who undergoing painful procedures (burn care). It is an instrument that utilizes technology to distract the child's attention and divert their cognitive and sensory stimulation to video animation⁷. On the other hand, it limits their cognitive thinking toward pain during the procedure. In addition, it

lets children experiment with realistic experiences that help them to overcome their fears and increase their relaxation by simply wearing a head-mounted display^{8,9}.

Virtual reality considers as a complementary strategy that prove beneficial results in diverting child's attention during painful procedures specially changing dressing of burn child's, the children wear a head-mounted helmet which help them to watch and hear a real environment. It provides a high level of isolation from the painful stimulus and the possibility to interact with the virtual reality videos¹⁰. It reported no side effect from using, children reported less time thinking about the pain and its intensity which facilitates care provided during dressing changes¹¹. Using this method of distraction will reduce the time required for dressing and promote faster dressing¹².

Nurses are the front line of care and possess many roles within the care of pediatric burn patients¹³. The nurse who providecares for children with burns injury should be aware about the physiologic changes that happen after a burn, also, identify subtle changes in the child's condition.^{14,15}.Nurse consider the key role in pain assessment, also they can determine what the pain effects on children, Also, they should be able to recognize the existence of non-pharmacological measures for pain management¹⁶.

Significance of the study

Burns are the fourth most common type of trauma worldwide. Burns injuries is a common cause of accidental deaths .it consider one of most public health problem in a developing country like Egypt. There is an 2,500 deaths and over 100,000 emergency room visits every year of burn injuries. Also, it considers the fourth leading cause of death under the age of 15. children who suffer from sever burn injuries live with chronic disabilities¹⁷.

World Health Organization pay attention for improvements burn care which includes dressing, promote infection control and appropriate pain management. Therefore, distraction by using a virtual reality during painful procedures reduces the child's perception of his/her pain and distress. Moreover, this type of distraction can also improve parent's satisfaction with the pain control provided for their child while receiving their treatment. Therefore, using virtual reality technology program for children during dressing change is necessary to improve both quality of care and healthcare outcome. So, there is an intense need to investigate the effect of this technology to alleviate pain during dressing change.^{7,11,18}.

1. Purpose of the study was:

To examine the effect of virtual reality technology on pain during dressing change among children with burn injuries.

1.2 Hypotheses:

- Children with burn injuries who will use virtual reality technology for pain distraction will have less pain during dressing change than children in the control group.
- Children with burn injuries in the virtual reality group will have less duration time during dressing change than children in the control group.

1.3 Operational definition:

Virtual reality technology: it is an instrument, which consist of mobile phone that generate a 3-D real-time animation and a head-mounted device⁴.

In this study, it means using this artificial construction of 3D environment via mobile technology. It included a head-mounted device (HMD) with 3D-enabled goggles, sensory input devices and headphones, which together allow a multisensory experience to divert a child's attention.

2. Methods:

2.1 Research design: A Quasi-experimental design was utilized for this study (study and control group).

2.2 Settings: The study was conducted in the burn care department and outpatient plastic surgery clinic at El-Menoufia University Hospital and in pediatric burn unit at Benha Teaching Hospitals , Benha City.

2.3 Sample: Purposive samples of 60 children with burn injuries were included in this study (30 children from El-Menoufia Hospital and 30 children from Benha Hospital). A random assignment used to divide children equally into a study and control group on both setting (Study group involved 30 children, they used virtual reality technology and 30 children in the control group did not use this instrument).

2.4 Inclusion criteria: children who have

- Total body surface burned area >1
- Age ranged from 3-10 years.

2.5 Exclusion criteria:

- Cognitive impairment

- Visual impairment'
- Received strong pain killer or sedative medication.

2.6 Tools of the study:

Five tools were used for data collection:

Five tools were used for data collection:

Tool one: Demographic characteristics of studied children. It included age, sex, depth of burn, site of injury, mode of injury and medication.

Tool two: Wong- Baker faces (FACES) pain rating scale: it was adopted from Wong & Baker¹⁹. It was used by the researcher to report children's pain (the scale measure how a child feels inside objectively). It consisted of six cartoon faces that range from a neutral expression (no pain) to a screaming face (very terrible pain). The score of the chosen face ranged from 0 to 10. "0" equals "No pain" and "10" equals "Very terrible pain". Researchers choose the face that could represent the amount of pain that the child experienced. The reliability was done using Cronbach's Alpha test ($r = 0.83$).

Tool three: Face, leg, activity, cry and consolability (FLACC) behavioral Pain Assessment Scale. It was adopted from Merkel et al.²⁰. It was used by the staff nurses to assess the child's level of distress and pain during dressing change.

- **Face :** Score "0" if the child has a relaxed face and shows interest in surroundings. Score "1" if the child has a worried facial expression. Score "2" if the child has closed eyes with deep furrows in the forehead, an open mouth and deep lines around the nose and lip.
- **Leg:** Score "0" if the muscle tone and motion in the limbs of the child are normal. Score "1" if the child has increased tone and intermittent flexion or extension of the leg. Score "2" if the child has hypertonicity and exaggerated flexion and extension of the leg.
- **Activity:** Score "0" if the child moves easily and normal activity. Score "1" if the child appears hesitant to move and tense. Score "2" if the child is in a fixed position, demonstrates side-to-side head movement.
- **Cry:** Score "0" if the child has no cry. Score "1" if the child has occasional cries, moans or whimpers. Score "2" if the child has frequent or continuous cries and moans.
- **Consolability:** Score "0" if the child is calm. Score "1" if the child responds to comfort by talking or touching in 30 seconds to 1 minute. Score "2" if the child requires constant comforting or inconsolable.

Interpreting the Behavioral Score:

- Each category is scored on the 0–2 scale, which results in a total score of 0–10. (0 _ Relaxed and comfortable, 1–3 _ Mild discomfort, 4–6 _ Moderate pain and 7–10 _ Severe discomfort or pain or both). The reliability was done using Cronbach's Alpha test ($r = 0.95$).

Tool Four: Visual analogue scale. It was adopted from Hawker et al.,²¹. It was reported by parents and interpreted by the researchers to assess the child's pain level. Score "0" means no pain, "1-3" means mild pain "4-6" means moderate pain and "7-10" means severe pain. The reliability was done using Cronbach's Alpha test ($r = 0.85$).

Tool five: Children physiological measurements of temperature, pulse, respiration, blood pressure and dressing duration time. It was measured by the researchers to assess child's general condition.

2.7 Program construction:

2.7.1 Written Permission:

An official permission to carry out the study was obtained from the administrators of each setting after submitting an official letter from the Dean of the Faculty of Nursing, Menoufia University explains the purpose of the study. Meetings were first conducted by the administrator of each setting to obtain permission for conducting the research and explains the aim and expected outcome of the study.

2.7.2 Tool development:

Tools were obtained by the researchers for data collection after a review of past and current literature related to pain assessment and multi distraction technology techniques. Books, articles, periodicals and magazines were used to be acquainted with the various aspects of the research problem.

2.7.3 Validity assurance purpose: tools were submitted to a jury of three experts from the Faculty of Nursing Staff "three professors in pediatric nursing".

2.7.4 Ethical considerations: a written consent was obtained from mothers of children who participated in the study. Parents and big children were informed about the privacy of their information, the study was voluntary,

harmless and confidentiality of their responses would be respected. They had the full right to refuse to participate in the study.

2.7.5 Pilot study: A pilot study was carried out on 6 children to test the applicability of the tools and clarity of the included tools as well as to estimate the average time needed to fill the tools. Those who shared in the pilot study were excluded from the main study sample.

2.8 Data collection procedure:

Data collection was carried out over a period of nine months Starting from January 2019 to september2019.

a-Pre- intervention phase.

- The researchers introduce themselves to the parents and children and explained the purpose of the study.
- Child Assessment was done for both study and control group at the beginning of the study.
- Demographic characteristics of studied children were obtained and recorded by the researchers (pretest).
- Children assessed for their pain during dressing change using Wong- Baker faces pain rating scale (pretest).
- Children assessed for their pain level using Visual analogue scale (pretest).
- Children FLACC behavioral pain scale was assessed by the nurses (pretest).
- Children Physiological measures was assessed and recorded by the researchers (pretest).

B -Intervention phase (Implementation):-

1- Prepare the needed equipment's:

- Virtual reality (VR) 3D glasses.
- VR selected video according to children age.
- Mobile with VR support system.

2-Children in the intervention group received training on the VR equipment to be familiar with the VR sets.



"Virtual Reality Headset, 3D VR Glasses, Person Mobile, Theater Headset"

3-Dressing change process

- Children fully immersed in the VR distraction method.
- The dressing change process included removing of the dressings, assessment, cleaning, sterilizing and covering the wound with a new dressing.
- During dressing procedure children reassessed using Wong- Baker FACES pain rating scale and FLACC behavioral pain scale (posttest).

C-Post intervention phase:

- Children reassessed while still immersed in the VR distraction method because pain stay for a while after dressing.
- Children reassessed by using Wong-Baker FACES pain scale, Visual analogue scale and FLACC behavioral assessment pain scale (posttest).
- Children reassessed for their physiological measurement (posttest).
- Children in the control group received only standardized dressing change and assessed by the same previous scale.

2.9 Data analysis:

Data were statistically analyzed by SPSS version22. Percentage, mean scores, standard deviation and t-test were used for parametric data. Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square (χ^2) test.

II. Result

Table (1): Distribution of children in virtual reality and control groups according to their demographic characteristics.

Demographic characteristics	Studied Groups (n=60)				χ ²	P. value
	virtual reality group (n=30)		Control group (n=30)			
	No	%	No	%		
1-Age						
3-6 years	18	60%	16	53.3%	0.07	.78ns
7-10 years	12	40%	14	46.7%		
2-Sex						
Male	15	50 %	21	70%	2.5	0.114ns
Female	15	50%	9	30%		
3-Total body surface area						
10-30%	16	53.3%	21	70%	3.1	0.212ns
30-50%	12	40%	9	30%		
>50	2	6.7%	0	0%		
4-Mode of Injury						
Hot water	15	50%	24	80 %	8.677	0.013ns
Flame retardant	9	30%	6	20%		
Chemical	6	20%	0	0%		
5-Medication						
Oxycodone	16	53.3%	15	50 %	2.975	0.395ns
Pain stop	8	26.7%	12	40%		
Paracetamol	2	6.7%	0	0%		
None	4	13.3%	3	10%		

N.B: ns means p>0.05 =not significant

As shown in Table 1, distribution of children in virtual reality and control groups according to their demographic characteristics. The table revealed that more than half of studied children their age ranged from 3-6 years old in both groups and 50% of them were male compared to 70% in the control group. In addition, more than half (53.3%) have total body surface area from 10-30% in the study group compared to 70% in the control group. As well as, hot water was the main mode of injury in both groups. Meanwhile, half and more than half (50%&53.3%) of children used Oxycodone as a pain reliever in both groups. Therefore, There was no statistically significant difference between the control group and virtual group groups in terms of age, sex, total body surface area (TBSA), mode of injury and types of medication used (p > 0 .05).

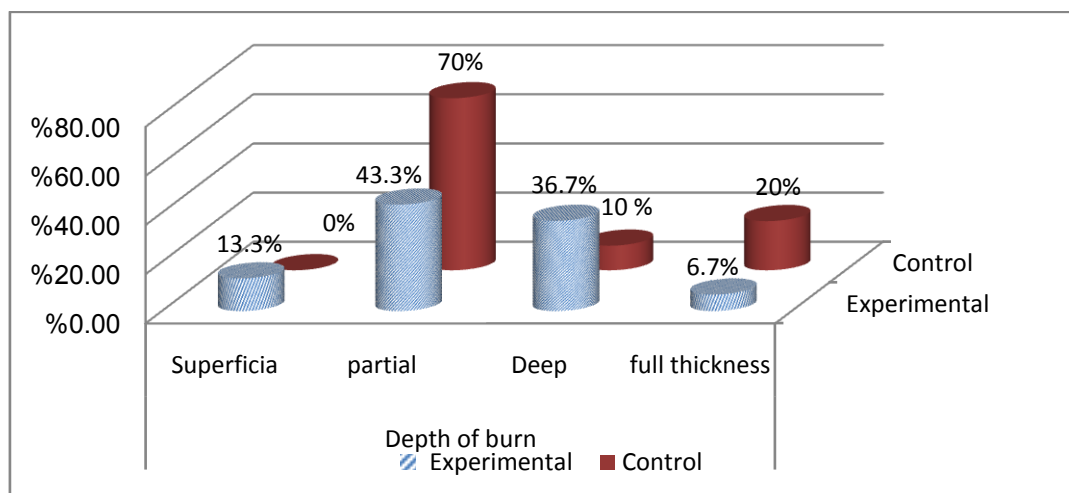


Figure (1): Depth of burn among studied children

Figure 1 illustrated depth of burn among studied children. It was clear that 36.7% had deep burn in the study group compared to 10% in the control group.

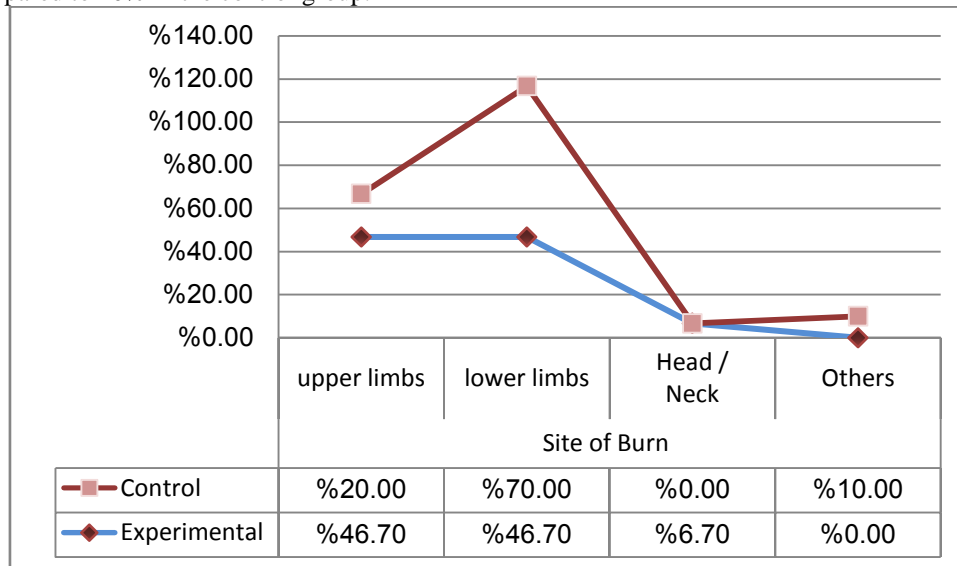


Figure (2): Distribution of studied children according to their site of burn.

Figure 2, illustrated the distribution of studied children according to their site of burn. It was obvious that 46.7% of the study group had upper and lower limbs burn compared to 20% and 70% in the control group.

Table (2): Pain intensity level among children in the virtual reality and control groups before, during and after dressing.

Child pain assessment	Studied Group (n=60)				X ²	p.value
	Virtual reality distraction		Control group(n=30)			
	No	%	No	%		
1- Before dressing						
No pain					1.901	0.593ns
Mild pain	1	3.3%	0	0%		
Moderate pain	9	30%	12	40%		
Severe pain	18	60%	15	50%		
Very terrible pain	2	6.7%	3	10%		
	0	0%	0	0%		
2- During dressing						
No pain					47.000	0.000 **
Mild pain	19	63.4%	0	0%		
Moderate pain	10	33.3%	3	10%		
Severe pain	1	3.3%	10	33.3%		
Very terrible pain	0	0%	14	46.7%		
	0	0%	3	10%		
3- After dressing						
No pain					50.000	0.000 **
Mild pain						
Moderate pain	15	50%	0	0%		
Severe pain	9	30%	3	10%		
Very terrible pain	6	20%	21	70%		
	0	0%	6	20%		
	0	0%	0	0%		

N.B: ns means p>0.05 not significant, P value < 0.05 *= significantly, ** p<0.001=high significantly

Table 2 represented pain intensity level among children in the virtual reality and control groups before, during and after dressing. The findings revealed that half and more than half (50% & 60%) of children in the control and virtual reality distraction groups had moderate pain before dressing change. Meanwhile, during and after dressing 63.4% and 50% of children in the virtual group did not have pain. On the other hand, all children in the control group continue to have pain with different degree and Less than half (46.7%) had severe pain during dressing change. Therefore, there were statistical significant differences between children in the two groups at 1% level of statistical significance.

Table (3): Pain intensity among children in the virtual reality distraction and control groups before and after dressing as reported by parents.

Parents assessment of the child's pain	Studied Group (n=60)				X ²	p.value
	Virtual reality distraction group (n=30)		Control group (n=30)			
	No	%	No	%		
1- Before dressing						
No pain	0	0%	0	0%	12.000	0.08ns
Mild	2	6.7%	0	0%		
Moderate	8	26.7%	0	0%		
Severe	20	66.6%	30	100%		
2- After dressing						
No pain	17	56.7%	0	0%	38.325	0.000 **
Mild	11	36.7%	0	0%		
Moderate	1	3.3%	27	90%		
Severe	1	3.3%	3	10%		

NB ns means p>0.05 not significant, **= high significantly

It illustrated in the table 3, Pain intensity among children in the virtual reality distraction and control groups before and after dressing as reported by parents. It showed that 66.6% of the children in the virtual reality group had severe pain compared to 100% in the control group before dressing change. Meanwhile, after dressing more than half of children (56.7%) in the virtual reality distraction group did not have pain. On the other hand, all children in the control group continue to have pain with different grades. Parents reported reduction in pain score in children in the virtual reality group than children in the control group. Therefore, the differences were found between the two groups (p < 0.001).

Table (4): Mean total score of the FLACC behavioral pain assessment among children in the virtual reality and control groups before, during and after dressing change as assessed by nurses.

Mean total score of FLACC	Studied group (n=60)		t.test	p.value
	Virtual reality distraction group (n=30)	Control group (n=30)		
1- Before dressing : x ± SD	6.77±1.72	7.4±0.81	1.83	0.07ns
2- During dressing: x ± SD	2.17±1.02	7.3±1.65	14.53	0.001 **
3- After dressing: x ± SD	1.77±1.04	6.2±1.97	10.89	0.001 **

N.B : ns means p>0.05 not significant P value < 0.05 *= significantly **= high significantly

Table 4 Showed mean total score of the FLACC behavioral pain assessment among children in the virtual reality and control groups before, during and after dressing change as assessed by nurses. The findings revealed that the mean total score of the FLACC behavioral pain assessment was approximately close in the studied groups before dressing change. Therefore, there were no statistical significant differences between the two groups. Meanwhile, during and after dressing, children in the virtual reality group had an observable reduction in pain score as reported by nurses than children in the control group. So, there were statistical significant differences between the two groups at 1% level of statistical significance during and after of intervention.

Table (5): Means and Standard deviation of vital signs in the virtual reality distraction and control groups before and after dressingchange.

Vital signs	Virtual reality distraction group(n=30)		t-test	Control group group(n=30)		t-test
	Before dressing	After dressing		Before dressing	After dressing	
1- Temperature x ± SD	37.4±0.14	37.2±0.07	0.61ns	37.4±0.12	37.5±0.12	0.81ns
2- Pulse x ± SD	101.08±2.64	93.9±9.57	8.9**	107.7±23.4	96.6± 6	.1 ns
3- Respiration x ± SD	26.1±0.2	21.8±0.4	1.98*	26.0±2.7	27±2.7	0.92 ns
4- Systolic blood pressure x ± SD	97.6±4.2	97.8±2.8	0.95ns	101.1±5.3	102.9±5.7	1.1 ns
5-Diastolic blood pressure x ± SD	66.5±1.8	63.0±2.1	1.98*	65.7±1.3	66.5±1	0.85 ns

N.B ns means p>0.05 not significant P value < 0.05 *= significantly

Table 5 represented means and standard deviation of vital signs in the virtual reality and control groups before and after dressing change. The findings showed declines in means of pulse, respiration and diastolic blood pressure in the virtual reality group after dressing change. Therefore, there were statistical significant differences between means of pulse, respiration and diastolic blood pressure before and after dressing at 5% and 1% levels of statistical significances except for temperature and systolic blood pressure. In relation to the control group, there were no statistical significant differences between the means of vital signs before and after dressing change.

Table (6) Mean of duration time during dressing change in the virtual reality distraction and control groups.

Duration Time during dressingchange	Studied groups (n=60)		T.test	p.value
	Virtual reality group n=30	Control group n=30		
	x ± SD	x ± SD		
x ± SD	12.77±4.25	19.1±4.5	5.6	0.001**

N.B p>0.05 **= means high significantly

Table 5 represented Mean and standard deviation of duration time during dressingchange in the virtual reality distraction and control groups. The table showed that children in the virtual distraction group had less time taken during dressing change than children in the control group.

III. Discussion

Pediatric burn cause both physical and psychosocial distress. Much of this distress is due to treatment of the burn. Dressing changes can be extremely distressing for both the children and parents. So, distraction technique commonly used to obviate child’s attention from pain and distress during treatment procedures²². The current study hypothesized that pain intensity of children with burn injuries reduced during dressing change after using virtual reality Technology for pain distraction in the study group than those in the control group. Also, children in the virtual reality group spent less time during dressing change than children in the control group. So, the results of the current study supported the study hypothesis

Regarding Pain intensity level among children in the virtual reality and control groups before, during and after dressing. the current study revealed that half and more than half of children in the control and virtual reality distraction groups have moderate pain before dressing change, this due to consequence of burn healing process .this finding congruent with Upton& Andrews, Who reported that burn wound cause the most traumatic and painful experience , particularly before dressing change which it was close to the healing process²³.

In relation to pain intensity during dressing change. the current study represents that two third of children in the virtual reality distraction group don't have pain and near half of them have mild pain, On the other hand, all children in the control group continue to have pain with different degree and Less than half had severe pain during dressing changes, this may be due to the effectiveness of virtual reality distraction in alleviation of pain experienced during a painful procedure. This study come in agreement with Chan, who reported that a significant difference in the children’s reported pain in the intervention group during and after

dressing change⁴. Also, Miller et al, reported that the use of multi-model distraction virtual reality as a distraction instrument in an outpatient burns clinic across three dressing changes, offered a superior pain reduction to children compared to standard practice²⁴. Also, Demeter et al, who reported that VR can be used as an effective manipulation for pain reduction in children with efficient conditioned pain modulation²⁵.

In the same consequence Parker et al, found that pain scores level were significantly decreased in the intervention group, it's showing a 17% reduction in the study group compared to control group²⁶. In the same direction Sharar et al, found that virtual reality technology can be used as an effective non pharmacological analgesic in pain management, child's immersed in VR distraction reported significantly decreased pain intensity²⁷. While, on the contrary Kipping et al, showed no significant improvement in pain intensity after using virtual reality distraction for burn care²⁸.

Regarding Pain intensity among children in the virtual reality distraction and control groups before and after dressing as reported by parents, the current study shows that the Parents reported reduction in pain score in children of the virtual reality group than children in the control group. In addition, more than half of children in the virtual reality distraction did not have pain. On the other hand, all children in the control group continue to have pain with different grades, this could be due to the effectiveness of virtual reality distraction technology as a non pharmacological method in pain reduction. This result comes in agreement with Miller et al, who found that parents of children with burn injuries observed reduction in pain and anxiety during dressing procedures when their child used multi model distraction virtual reality²⁴.

Concerning the FLACC behavioral pain assessment among children in the virtual reality and control groups before, during and after dressing change as assessed by nurses, the finding of the current study clarified that children in the virtual reality group had an observable reduction in pain score during and after dressing than children in the control group as reported by the nurses. These results ensure that children had a reduction in pain intensity as a consequence of using the VR distraction technique, this study comes in agreement with Kipping et al, who found that nurses reported a significant reduction in pain scores during dressing removal for children who received VR, compared to children who received standard distraction²⁹. Also, Jones et al, found that Pain ratings during the VR session were reduced from baseline by 60% and by 33% after the VR session³⁰.

Regarding duration time during dressing change in the virtual reality distraction and control groups. The current study revealed that children in the virtual distraction group had less time taken during dressing change than children in the control group, This reflected that VR group are more calm and cooperative during dressing change which results in pain alleviation. This study is consistent with Miller et al, who found that multi model distraction had reduced pain experiences for children during burn care procedures and had shorter dressing time³¹. In the same line Hua et al, reported that the use of VR as a distraction intervention in a pediatric patient promotes highly pain reduction than children received standard distractions. Virtual reality improves clinical efficiency by reducing dressing changes length of time³².

In relation to vital signs in the virtual reality and control groups. The findings showed declines in means of pulse, respiration and diastolic blood pressure in the virtual reality group after dressing change. This comes in disagreement with Miller et al, who reported that there is no difference regarding physiological measurement between different children with burn injuries and control group²⁴.

IV. Conclusion

Based on the findings of the present study, the following is concluded:

1. Children in the study group (VR) had a lower pain intensity during dressing change than children in the control group.
2. Children in the study group (VR) had less duration time during dressing change than children in the control group.

Recommendations

Based on the previous findings the following recommendations are suggested:

1. The use of virtual reality distraction should be integrated as a part of pain management during dressing change for children with burn injuries.
2. Application on a larger sample size to ensure generalizability of the results.

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