https://doi.org/10.15218/ejnm.2018.10 Erbil j. nurs. midwifery, Vol. 1, No. (2), Nov, 2018
Original Article

Effectiveness of Distraction Therapy on Children's Pain Perceptions During Peripheral Venous Cannulation at Pediatric Teaching Hospital in Erbil City

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ABSTRACT

Background and objective: Relief of pain is a basic need and right of all children; effective pain management requires health professionals to be able to apply a number of interventions to achieve optimal results. The current study aimed to discover the effects of distraction therapy on children's pain perception during peripheral venous cannulation.

Methods: A quasi-experimental study was carried out at emergency unit of Raparin Paediatric Teaching Hospital in Erbil city, Iraq. Data collection occurred from Feb 22, 2016 to May 25, 2016. A non-probability purposive sample of 120 children who were undergoing peripheral venous cannulation are recruited for the study. Data was collected through a questionnaire format and a standard observational checklist Assessments of the face, legs, activity cry, and the console ability scale were used to assess the pain perception of child. A cartoon and animation video films were used by the researcher, as distraction therapy for the intervention group, while the control group received traditional routine care by the nurses. The statistical package for social science Version 22 was used for data processing and statistical analysis such as frequency, percentage, mean, SD, F-test, paired t-test, chi-square and Fisher exact test.

Results: The study found that the majority of children in the intervention group experienced mild discomfort and pain while the majority of children in the control group experienced severe pain or discomfort or both. The results revealed that there were very highly significant differences in the levels of pain perception between intervention and control groups.

Conclusion: Application of distraction therapy could have a positive effectiveness for relieving pain among preschool age children during peripheral venous cannulation.

Keywords: Cannulation, carton , pain perception , preschool, nurse.

Received: 6/3/2018 *Accepted: 22/10/2018* *Published: 30/11/2018*

INTRODUCTION

Pain is a common experience for people in all societies around the world, and it is a necessary part of routine clinical care. Today, pain is known as the fifth vital sign, and health professionals are recommended to monitor and manage it when caring for patients [1]. Peripheral venous cannulation is the insertion of a vascular access device into a peripheral vein. It is a procedure in which the patient's skin is wounded with a needle to allow insertion of a temporary plastic tube into a vein [2]. Peripheral venous cannulation in pediatrics is one of

the most distressing events and the most usually performed invasive procedures that the child may expose during his/her hospitalization or illness [3]. Relief of pain is an essential need and right of all children, and in order to meet the pain management needs, health professionals must be willing to try a number of interventions to achieve optimal results [4]. To confirm adequate pain relief and to give the children a feeling of control over the situation, non-pharmacological techniques are broadly accepted as additional strategies that may be used independently or in addition to pharmacological methods [3]. Distraction is one of the non-pharmacological and psychological strategies usually used for needle-related procedural pain in children [5]. Pain is a stressful experience that is considered to be a global health problem, and children are vulnerable and under-served population. The emergency department itself is a very stressful place for children. It is essential to focus on the child rather than the procedure. Untreated pain causes stress and can sensitize a child pain pathways making the feeling of pain worse. Assessment of healthcare professionals, especially nurses, in this setting is necessary in order to reduce pain as much as possible, and also using appropriate methods for relieving pain to ensure a comfortable environment for intervention. This study aimed to find out the effect of distraction therapy on children's pain perceptions during peripheral venous cannulation at emergency unit of Raparin Pediatric Teaching Hospital (RPTH).

METHODS

A quasi-experimental design was used for conducting this study between the periods from November 2015 to November 2016. The study was carried out at emergency unit in Erbil city, Kurdistan region, Iraq. The present study was carried out at emergency unit of RPTH. This hospital is located on the main street of Shaqlawa and was established in 2005. The hospital consists of outpatient and inpatient departments. The inpatient department includes the emergency, surgery, and medical units. Emergency department is consists of 80 beds. There were 14 nurses who were working in this unit; and divided into three shifts, morning, evening and night shift, there were seven nurses working in morning shift, three nurses in the evening shift and four nurses working in the night shift and each day more than 90 children from different developmental stages, accompanied with their parents attended this unit for peripheral venous cannulation.

The target populations included children whose aged between two to six years old undergoing peripheral venous cannulation. 120 children were involved in this study including both genders. It was divided into two equal groups, with 60 participants in the intervention and 60 in the control group. Children who were admitted to hospital and need peripheral venous cannulation. A verbal agreement was taken from the parents.

The children with mental disabilities, cerebral palsy, autism, Down syndrome, audibly handicapped (blindness deaf and dumb) or seriously ill were excluded from the study.

The instrument of data collection consisted of the three parts: the first part was socio-demographic characteristic. A list of 16 items that covered demographical characteristics of children and parents including date of birth, gender, ethnicity, address, child attending a child care institution, history of previous cannulation, reason for admission, site of current cannulation, child's order in the family,

occupation of the mother and father, father's and mother's level of education, name of the cartoon or animation films or movies child chosen, cannulation completed with how many attempts. The second part was assessment of children's pain by face, legs, activity cry, and the console ability (FLACC) scale. And the third part was physiologic measurement (puls rate and oxygen saturation). The FLACC Scale is used for children who are two months to seven years of age and includes five categories of behavior face, legs, activity, cry, and console ability. The (FLACC) pain scale presents a pain assessment scale between 0 and 10. In order to use the FLACC scale, the researcher has to observe a child for one to five minutes [6]. Each category the behavioral score (FLACC) is scored on the 0–2 scale, which results in a total score of 0–10. Zero means relaxed and comfortable, from 1–3 means mild discomfort from 4–6 means moderate pain, and from 7–10 means severe discomfort or pain or both [6]. The questionnaire has been validated by panel of eight experts in different fields. Internal consistency of the study was obtained through applying of Pearson correlation (r), it was 0.87. Inter-rater reliability test were used to determine the reliability of the scale and questionnaire. Frequency and percentage, mean and standard deviation, Chi square, F-test, Paired t-test, Fisher exact test were used for analyze and determine the significant differences and association between control and intervention group and demographic characteristics.

RESULTS

In the current study results, as revealed in Table 1, the highest percentage (36.7%) of children in the intervention group were aged between 24 – 35 months, whereas 19 (31.7%) of children in the control group aged between 36 – 47 months. Half of children in the intervention group were male and half of them were female, while 31 (51.7%) of children in the control group were female and 29 (48.3%) of them male. The majority of children 49 (81.7%) were Kurd in both groups respectively. Regarding the daycare centers attending, most children (90%) in intervention group and 52 (86.7%) in control group did not attend daycare centers and the highest percentage of children 44 (73.3%) and 52 (86.7%) had a previous history of cannulation in both intervention and control groups respectively. Table 2 shows that the comparison between intervention and control groups regarding levels of pain. In the intervention group the highest percentage of children 33 (55%) had mild discomfort while in the control group, the highest percentage of children 34 (56.7%) had severe pain and/or discomfort. Analysis detected the presence of very highly significant < 0.001 difference in the levels of pain perceptions between two groups. A comparison between intervention and control group in regard to pulse rate and oxygen saturation before and after cannulation in table 3. Current result clarified that the mean and SD before cannulation were 114.62 ± 10.98 for pulse rate and 97.5 ± 1.31 for oxygen saturation in the intervention group while regarding control group it was found that 117.92 ± 15.89 for pulse rate 97.32 ± 1.38 for oxygen saturation. pulse rate 97.32 ± 1.38 for oxygen saturation. This result also indicates that the mean and SD after using cartoon or animation films and movies were 127.98 ± 16.62 for pulse rate and 97.02 ± 1.31 for oxygen saturation, whereas concerning to control group it was found that the mean and SD 148.83 ± 21.78 for pulse rate and 95.77 ± 2.3 for oxygen saturation. Statistical significance difference was found considering pulse rate and oxygen saturation before and after distraction therapy (using cartoon or

animation films and movies) p= < 0.001 respectively. The association between child's socio-demographic characteristics and level of pain in intervention group is displayed in Table 4. There was a significant association between age group and level of pain. Regarding gender, it was found that there was a non-significant association between gender and level of pain. Concerning ethnicity of the child and history of the previous cannulation, it was found that there was not any significant association between ethnicity and history of previous cannulation with level of pain in the intervention group.

There were no significant associations between levels of pain and child's socio-demographic characteristics such as age group, gender, ethnicity, and history of the previous cannulation respectively (Table 5).

Table 1: Children's socio-demographic characteristics.

Socio-demographic Characteristics	Study Groups (n= 120)			
	Intervention (n= 60)		Control (n= 60)	
	No.	%	No.	%
Age Group / Month				
24-35	22	36.7	18	30
36-47	16	26.7	19	31.7
48-59	9	15	9	15
60-71	11	18.3	12	20
Over 72	2	3.3	2	3.3
Gender				
Male	30	50	29	48.3
Female	30	50	31	51.7
Ethnicity				
Kurd	49	81.7	49	81.7
Arab	6	10	7	11.7
Turekman	5	8.3	4	6.6
Type of Day Care attended				
Not attending day care centers	54	90	52	86.7
Nursery	0	0	2	3.3
Kindergarten	6	10	6	10
History of the previous Cannulation				
No	16	26.7	8	13.3
Yes	44	73.3	52	86.7

Table 2: Comparison between intervention and control groups regarding levels of pain perception

Pain Level	Groups				P-value / F-test
	Intervention		Control		
	No.	%	No.	%	
Relaxed and Comfortable	17	28.3	0	0	**< 0.001 VHS**
Mild Discomfort	33	55	12	20	
Moderate Pain	10	16.7	14	23.3	
Severe Pain or Discomfort or Both	0	0	34	56.7	

Table 3: Comparison between physiologic measurement before and after cannulation for both intervention and control groups.

Groups	Pulse Rate		P-value / Paired / t-test
	Before Cannulation	After Cannulation	
	Mean ± SD	Mean ± SD	
Intervention	114.62 ± 10.98	127.98 ± 16.62	< 0.001 **VHS**
Control	117.92 ± 15.89	148.83 ± 21.78	< 0.001 **VHS**
	SPO2		
Groups	**Before Cannulation**	**After Cannulation**	**P-value / Paired / t-test**
	Mean ± SD	**Mean ± SD**	
Intervention	97.5 ± 1.31	97.02 ± 1.31	< 0.001 **VHS**
Control	97.32 ± 1.38	95.77 ± 2.3	< 0.001 **VHS**

Table 4: Association between socio-demographic characteristics and level of pain in intervention group

Socio-demographic characteristics	Level of Pain						Fisher's Exact Test
	Relaxed and Comfortable		Mild Discomfort		Moderate Pain		
	No.	%	No.	%	No.	%	
Age group / months							
24-35	2	3.3	13	21.7	7	11.7	
36-47	5	8.3	11	18.3	0	0	
48-59	3	5	5	8.3	1	1.7	0.034 **S**
60-71	6	10	3	5	2	3.3	
Over 72	1	1.7	1	1.7	0	0	
Gender							
Male	11	18.3	15	25	4	6.7	0.342* **NS**
Female	6	10	18	30	6	10	
Ethnicity							
Kurd	16	26.7	27	45	6	10	
Arab	1	1.7	3	5	2	3.3	0.259 **NS**
Turkmen	0	0	3	5	2	3.3	
History of the Previous Cannulation							
No	4	6.7	10	16.7	2	3.3	0.765 **NS**
Yes	13	21.7	23	38.3	8	13.3	

Table 5: Association between child's socio-demographic characteristics and level of pain in control group

Socio-demographic characteristics	Control Group						P_ Value
	Mild Pain		Moderate Discomfort		Severe Pain or Discomfort or Both		
	No.	%	No.	%	No.	%	
Age Group							
24-35	2	3.3	5	8.3	11	18.4	0.066***NS**
36-47	2	3.3	3	5	14	23.4	
48-59	3	5	1	1.7	5	8.3	
60-71	5	8.3	3	5	4	6.7	
Over 72	0	0	2	3.3	0	0	
Gender							
Male	4	6.7	6	10	19	31.7	0.363 **NS**
Female	8	13.3	8	13.3	15	25	
Ethnicity							
Kurd	11	18.3	10	16.7	28	46.7	0.631***NS**
Arab	1	1.7	2	3.3	4	6.7	
Turekman	0	0	2	3.3	2	3.3	
History of the Prevous Cannulation							
No	2	3.3	3	5	3	5	0.471***NS**
Yes	10	16.7	11	18.3	31	51.7	

*Fisher's Exact test was used.

DISCUSSION

Results show that the highest percentage of children were between the age 24 - 35 months in the intervention group and 36 -45 months in control group. This finding was in contrast with a study of Gupta et al 2014 who carried out a quasi-experimental study for 70 children admitted to pediatric ward of Guru Go bind Singh medical hospital, Faridkot, India, which assessed and compared the analgesic effect of holding the child by a family member versus holding the child by a family member along with an animation distraction intervention on the level of pain perception during venipuncture in children up to seven years of age, and found that 37.14% were from age 60 – 71 months and over [7]. Concerning the gender of children, the findings of the present study shows that children who admitted for cannulation have equal number for both male and female in both groups. This result are supported by a study in China which found that most children admitted for cannulation were female [8]. But,

this contradicts with a study carried out by Canbulat et al. (2015) which found that the majority of children were male in both groups [9]. The results of the current study is in contrast with the study carried out in India by Gandhar et al 2015 and stated that the majority of children were male in both groups [10].

According to the history of the previous cannulation, the current study revealed that the majority of children had a history of the previous cannulation. The present study is in agreement with the study from 2015, which found that most of the children had exposure to same painful procedures [4].

The current study revealed that more than half of children have mild discomfort in the intervention group, while more than half of the children have severe pain or discomfort or both in control group. There were statistically very highly significant differences in the level of pain between intervention and control group. That's to say, most of children in intervention group focused on the TV and they were Inattentive from the procedure during cannulation and the distraction were effective in relieving pain and making children inattentive. This result is supported by a research from 2016, which indicated the efficacy of distraction with videos in reducing anxiety and pain in children subjected to venipuncture in pediatric emergency and found a presence of a significant difference between the video distraction group and the control group. It also showed that moderate and severe pain was more frequent in the control group than in the video distraction group [11]. Another study conducted in India assessed the effectiveness of animated cartoons as a distraction strategy to reduce behavior response to perception of pain among children of three to six years old who were undergoing venepuncture. This study found that there was significantly less pain score at pre, during and post venipuncture with the animated cartoon as distraction strategy as compared to the routine group [12]. The current study also corresponds with Wang et al. (2008), which reported that there was a significant difference between the intervention and control group [13]. These results are contradicted with another study that showed that audio music distraction did not result in a reduction of pain, anxiety or uncooperative behavior during dental procedure on young children [14].

The study results revealed that there was a very highly significant association between the physiologic measurement of pulse rate and oxygen saturation before and after cannulation in both intervention and control groups. This is indicated that the painful stimuli had special effects on the child physiologically, especially on the heart rate and oxygen saturation, even they assigned to cartoon or animation films and movies. The results from a study conducted in China are in disagreement with the current study. In the China study, participants in the virtual reality distraction group had lower pulse rate during medical procedures compared to the control group. However, the difference in oxygen saturation between the two groups was not significant [8]. Furthermore, another study also disagrees with the results of the current study, and that study identified no differences between groups for pre-procedural or procedural mean of pulse rate or oxygen saturation ($p > 0.05$) [15].

Most of children had mild discomfort in the age group of 24 – 35 months with a significant association between level of pain and child's age in the intervention group. Children in this age group had better interaction with the cartoon films.

The result of the present study is supported by a quasi-experimental study by James et al. (2012), which found that the age increases the perception of pain decreases suggesting that there is an inverse relationship of pain responses with the age [12]. Other research disputes the current study's findings including one that used cartoon distraction to reduce venipuncture pain among pre- schoolers and found no significant association between level of pain and child's age [16]. Researchers recommended further studies about the differences between kurdi and children from another cultures.

Regarding the gender of the child in the intervention group, the majority of children had mild discomfort, and it showed no significant association between level of pain and child's gender. Researchers thinks this is related to the child raring patterns in the family which encourage children for bearing of pain. The current study is in agreement with other study findings which revealed that gender was not influenced the perception of pain [3, 17].

Concerning the history of the previous cannulation in the intervention group, the majority of children had mild discomfort in the intervention group with no significant association between the child's previous cannulation and level of pain. The result is in agreement with the quasi-experimental study that found that there was no significant association between the level of pain and previous venipuncture [16].

The majority of children who had severe pain and/or discomfort with no significant association between the age and their level of pain. These results are in agreement with prior research [10] and are in disagreement with other research [3].

Concerning the control group, the highest percentage had severe pain and/or discomfort and there was no significant association between gender and level of pain. Results are compatible with one study that found that gender was not significantly association with the level of pain [18].

More than half of children in this study had a history of the previous cannulation with no significant association between the history of previous cannulation and child's level of pain in control group. This result is in agreement with other research finding which showed that there was no significant association between the level of pain and history of previous venipuncture [16]. Whereas it is in contrast with the study which revealed that children who had a history of the previous hospitalization had an increased perception of pain and distress during the current hospitalization [3].

CONFLICTS OF INTEREST

There is no conflict of interest.

ACKNOWLEDGMENT:

The author expresses gratitude for the Raparin Pediatric Teaching Hospital staff for their support through data collection, especially Mr. Fadhil H. Abdulla.

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