

Effect of Using Non Pharmacological Methods on Relief of Pain and Fear among Children Undergoing Venipuncture

*Hekmat Ibrahim, **Youssria Elsayed Yousef, **Manal Mohamed Ahmed Ayed, and ***Eman Ezz Elrigal

* Pediatric Nursing, Faculty of Nursing, Assuit University, ** Pediatric Nursing, Faculty of Nursing, Sohag University, *** Community Health Nursing Department, Faculty of Nursing, Sohag University.

Abstract

Pain relief is an important issue to be discussed in addition to how distraction techniques during painful procedures should be used to guide children's attention away from the painful stimuli. **The study aimed to** evaluate effect of using non pharmacological methods on relief of pain and fear among children undergoing venipuncture. **Research design:** An experimental study was undertaken on children from 3 to 6 years old who were undergoing venipuncture. **Setting:** the current study was conducted in pediatric outpatient clinics and pediatric wards at Sohag University Hospital from May to November 2016. **The study sample** included 90 preschool age children selected through purposive sampling method. They were divided into 3 equal groups, (30 children in bubbles distraction group, 30 children in cartoon distraction group and 30 children in control group). **Tools:** four tools were used as the following: A structured questionnaire, Numeric Rating Scale (NRS), Wong-Baker FACES Pain Rating Scale and Children's Fear Scale. **Results:** In the current study 53.3% of children were females 46.7% were males in distraction group with a mean age of 4.3±1.4 years. A highly significant difference regarding the mean scores of pain on numeric rating scale between distraction groups and. **Conclusion:** Non pharmacological methods are effective distraction techniques for relief of pain and fear among children during venipuncture. **Recommendation:** Application of the practice of cartoon and bubbles distraction during intravenous injection is recommended among nurses in the care of children in order to reduce pain and fear related to intravenous injection.

Key words: Non Pharmacological Methods, Relief of Pain, Fear, Children, Venipuncture

Introduction

The Pain is defined as one of the health problems in children and its incidence under abnormal physiological conditions is regarded as the most important body's defense mechanism. Pain in infants and children can be difficult to assess which has led to the creation of numerous age-specific pain management tools and scores (Srouji and Ratnapalan, 2010).

Intravenous injection is considered a common source of pain in children. In addition to experiencing pain during venipuncture, many children also experience fear before procedures which can heighten a child's pain perception and anxiety leading to an overall unpleasant experience. So relief of pain and suffering, whenever possible, is an important responsibility of nurses caring for children because pain can result in a variety of negative long term consequences (Kennedy et al., 2008).

Distraction is a simple and effective technique that directs children's attention away from noxious stimuli. However, there is a multitude of techniques and technologies associated with distraction (**Donna and Ran, 2011**), and most obvious non-drug treatment is behavioral therapy and distraction method is one of these therapies (**Heidari et al., 2014**). In this way, pleasant things deflect attention from medical procedures and reduce the perception of pain (**Masoumeh et al., 2012**). This method is much less expensive than drug therapy with fewer side effects (**Alavi et al., 2008**). Several methods have been proposed for pain relief with non-pharmacological methods. **Yoo et al.** tested the effects of cartoon animation on 20 children and found that, the difference between experimental and control groups was significant (**Yoo et al., 2011**).

Distraction methods includes visual distraction (counting objects, watching TV), vocal distraction (listening to music), touch-motion distraction (slow regular breathing), and purposive distraction (using toys). Other interventions include relaxation, hypnosis, modeling, desensitization, contingency management, selective attention, stress inoculation, cognitive restructuring and coping skills training (**Duff, et al., 2012**). Of the distraction methods used during school age, purposive distraction (using toys as bubbles) and audio-visual distraction is the most effective (**Sng, et al. 2013**).

Audio-visual distraction like cartoon distraction is a simple method that help nurses to solve the problem of lack of attention to pain relief that diverts attention from a noxious stimulus through passively redirecting the subject's attention or by actively involving the subject in the performance of diversion task (**Bagheriyan, et al., 2012**).

Cartoon distraction direct concentration to other and take the attention away from own pain and concentrate on concern for

someone else, more positive thoughts and distract with other sensations i.e. cartoon distraction has the ability to jog emotions and break the connection between person and his/her emotional pain (**Kaheni et al. 2016**).

Distraction techniques are often provided by nurses, parents or child life specialists and help in pain alleviation during procedures and the reduction of such pain and fear becomes the responsibility of health care professionals to an extent as possible while maintaining patient safety by using various pharmacological and non pharmacological interventions (**Lee and Yeo, 2013**).

Nurses should relieve a child's suffering not only because of the consequences of unrelieved pain but also because pain management may have benefits such as earlier mobilization, shortened hospital stays and reduced costs (**Harsh, et al., 2014**).

Significance of the study:

The alleviation of pain in children is not only an ethical obligation, but it also averts immediate and long-term adverse consequences (**Carbajal, 2008**). Caring for a child with pain can cause family emotional and financial stress (**Twycross and Finley, 2013**). Children remember pain and may avoid future medical care because of painful experiences in a hospital or clinic and can cause numerous physiological problems such as dilated pupils, sweating, increased heart rate, increased blood pressure and skin rash, which if it is not controlled timely can cause chronic problems even death. Distraction has been used successfully as an intervention to decrease children's pain during painful procedures (**Genikl, et al., 2015**).

Aim of the study:

The aim of this study was to evaluate the effect of using non pharmacological

methods on relief of pain and fear among children undergoing venipuncture.

Research hypothesis:

- Children who will be exposed to distraction methods as cartoon and bubbles distraction techniques will experience mean scores of pain and fear less than those not exposed to distractions.
- Cartoon and bubbles may distract children during venipuncture.

Subjects and Methods:

Research design: true experimental study was adopted in this study.

Setting: the current study was conducted in pediatric outpatient clinics and pediatric wards at Sohag University Hospital.

The study sample comprised 90 school age children were selected through purposive sampling method during six months and were divided randomly into 3 equal groups, (30 children in bubbles distraction group, 30 children in cartoon distraction group and 30 children in control group).

Inclusion criteria

- Conscious children who were admitted in pediatric ward of Sohag University hospital.
- All the children who were scheduled for injection and aged between 3-6 years.
- Co-operative children.

Exclusion criteria

- Unconscious child.
- Child under effect of any sedative/anticonvulsant/analgesic drug.
- Children who are critically ill.

- Children with neurological deficit.

Tool for data collection: four tools were used in the current study as the following:

Tool- I: A structured questionnaire was developed based on review of the related literature, consisted of three questions about the demographic characteristics of children, including gender, age, and residence.

Tool - II: Numeric Rating Scale (NRS), The NRS for pain is an 11-point numeric rating scale, with 0 representing “no pain” and 10 “unbearable pain.”

Tool - III: Wong-Baker FACES Pain Rating Scale, used to assess the effectiveness of cartoon and bubbles in pain response among children. It consists of 6 points with a total score of 10. It was used to depict pain perception in children. The scale shows a series of faces ranging from a happy face at 0, "No hurt" to a crying face at 10 "Hurts worst" with maximum score as 10 and minimum as 0 categorized as 0 – No Hurts, 2 – Hurts Little Bit, 4 – Hurts Little More, 6 – Hurts Even More, 8 – Hurts Whole Lot and 10 – Hurts Worst. The researcher chose the face that best described how child feels during intravenous injection (**Wong, and Baker, 1988**).

Tool - IV: Children's Fear Scale (CFS) consists of five faces representing varying degrees of fear. Researcher select the face that represents how she/he feels and the ordered faces are scored from 0 to 4.

Pilot study: A pilot study was carried out before starting of data collection including 10% of the study sample for the purpose to test the clarity, completeness and to determine the time involvement. According to the results of the pilot study, the needed modification, omissions and/or additions were done. Participants in the pilot study were excluded from the study subjects.

Tool validity and tool reliability:

-The questionnaire was tested for its validity where its value was 92.0%., Reliability was estimated by Alpha Cronbach's test for the tool and its result was 0.84.

-Numeric Rating Scale (NRS), reliability analysis found an interclass correlation coefficient of 0.83 ($P < 0.001$) (John, et al., 2008).

- Wong-Baker FACES Pain Rating Scale, the WBS were highly correlated (Spearman's $\rho > 0.80$) with those on a visual assessment scale (VAS) (Garra, et al., 2010).

-Children's Fear Scale, The CFS has shown good evidence of test-retest ($r_s = 0.76$, $p < 0.001$) and inter-rater ($r_s = 0.51$, $p < 0.001$) reliability as well as construct validity among children (McMurtry et al., 2011).

Methods for data collection:

- Before starting this study, administrative approval was taken from authorities in the setting. Permission was obtained from dean of Faculty of Nursing Sohag University.

- After obtaining oral permission from the children for data collection, the children were interviewed by the researchers where full explanation of each tool was given.

- Data collection was conducted from May to November 2016.

- A total of 90 questionnaires were distributed and the 90 children were equally and randomly assigned to three groups, bubbles distraction group 30 children, cartoon distraction group 30 children and the control group, 30 children.

- Data collection was done during the routine work of the hospital.

-The participants took about 15-20 minutes to fulfill the questionnaire.

- Evaluation was done through cartoon and bubbles distraction techniques on relief of pain and fear during intravenous injection of children by faces, pain scale, numeric rating scale and children fear scale.

- The cartoon was administered, through researcher' laptop during the painful procedure, and continued throughout the procedure during which pain was assessed by using the Wong Bakers FACE pain rating scale, numeric rating scale and children fear scale.

- The bubble play was used by the children during the painful procedure, and continued throughout the procedure during which pain was assessed by using the Wong Bakers FACE pain rating scale, numeric rating scale and children fear scale.

-The researcher scored the scale by observing children's behavior during venipuncture. After injection, children's pain was assessed by numerical pain scale, this scale was showed to the children and they were asked to choose their pain from numbers 0 to 10, Wong Bakers FACE pain rating scale, this scale was showed to the children and they were asked to choose their pain from numbers 0 to 10 and Children's Fear Scale (CFS) this scale was showed to the children and they were asked to choose their pain from numbers 0 to 4.

Ethical consideration:

The data collection was voluntary in nature and strict confidentiality was assured. Explanation of the aim and methodology of the study was done to all children by the researchers. The right to refuse to participate in the study was emphasized to the

participants and consent to participate in the study was secured orally.

Statistical analysis:

Data collected and analyzed by computer program SPSS" ver. 21" Chicago. USA. Categorical variables were described by number and percent, where continuous variables described by mean and standard deviation (Mean, SD). Person's correlation used to determine significance between variables in same group. Significance is considered when $P < 0.05$ while $P > 0.05$ is considered not significant.

Results:

Regarding demographic characteristics of children in **table (1)**, the current study revealed that, (56.7%) were females and (43.3%) were males in control group, (33.3%) were females and (66.7%) males in bubbles group and (53.3%) were females and (46.7%) males in cartoon group and the mean age of control group was (3.9 ± 1.1) years, and (3.2 ± 2.7) years in bubbles group and (4.3 ± 1.4) years in cartoon group. As regard residence (46.7%), (33.3%) and (56.7%) of children in control group, bubbles group and in cartoon group were from urban respectively.

Table (1): Frequency distribution of socio-demographic characteristics of children between the control, bubbles and cartoon groups

Socio-demographic characteristics	Control (n=30)		bubbles (n=30)		Cartoon (n=30)	
	No.	%	No.	%	No.	%
1- Gender						
Male	13	43.3	20	66.7	14	46.7
Female	17	56.7	10	33.3	16	53.3
2- Age						
Mean \pm SD age	3.9 ± 1.1		3.2 ± 2.7		4.3 ± 1.4	
4- Residence						
Urban	14	46.7	10	33.3	17	56.7
Rural	16	53.3	20	66.7	13	43.3

Table (2) stated that, there was a highly significant difference between controls, bubbles, cartoon regarding mean scores of pain on numeric rating scale, where cartoon group had little mean scores of pain on numeric rating (2.2 ± 1.4) .

Findings in **table (3)** also revealed that, in control group, the majority 27(90.0%) got severe pain, 3(10.0%) got moderate pain and none remained relaxed during venipuncture whereas in bubbles group 14(48.0%) got moderate pain, 11(36.0%) remained relaxed and only 5(16%) got severe pain. Whereas in cartoon group 10(33.3%) got moderate pain, 17(56.7%) remained relaxed and only 3(10%) got severe pain.

Table (4) indicated that, there was a highly significant difference among controls, bubbles, cartoon groups regarding intensity of pain on WBFS, where (56%) of children in cartoon group reported no hurt in intensity of pain on WBFS

Table (5) stated that, there was a highly significant difference of children fear scale among the control, bubbles and cartoon groups. Less mean scores of children fear were rated by the children in cartoon group (1.2 ± 0.4) .

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Table (2): Comparison of mean scores of pain on NRS between the control, bubbles and cartoon groups

Items	Control (n=30)	Bubbles (n=30)	Cartoon (n=30)	p-value
Mean Scores of Pain on NRS	6.2±1.4	4.2±1.4	2.2±1.4	0.000*

Table 3: Comparison of numeric rating scale between the control, bubbles and cartoon groups

Items	Control (n=30)		Bubbles (n=30)		Cartoon (n=30)		p-value
	No.	%	No.	%	No.	%	
Numeric rating scale							
Relaxed	0	0.0	11	36.0	17	56.7	0.000*
Moderate pain	3	10.0	14	48.0	10	33.3	
Sever pain	27	90	5	16.0	3	10	

Table 4: Comparison of intensity of pain on WBFS between the control, bubbles and cartoon groups

Items		Control (n=30)		Bubbles (n=30)		Cartoon (n=30)		p-value
		No.	%	No.	%	No.	%	
Intensity of Pain on WBFS	No hurt	3	10	3	10	16	56	0.000*
	Hurts Little Bit	2	6	4	14	6	20	
	Hurts Little More	3	10	5	18	3	9	
	Hurts Even More	4	12	3	9	2	6	
	Hurts Whole Lot	6	20	7	22	1	3	
	Hurts Worst	12	42	8	27	2	6	

Table (5):_Comparison of mean scores of pain on children fear scale between the control, bubbles and cartoon groups

Items	Control (n=30)	Bubbles (n=30)	Cartoon (n=30)	p-value
Mean Scores of children fear	2.2±1.4	1.2±1.4	1.2±0.4	0.000*

Discussion:

Distraction is considered the most effective procedure to reduce pain during medical procedure (**Donna and Ran, 2011**). So that the aim of the study was to evaluate the effect of using non pharmacological methods on relief of pain and fear among children undergoing venipuncture.

The current study revealed, there was a highly significant difference among controls, bubbles, cartoon regarding the mean scores of pain on numeric rating scale, where cartoon group had little mean scores of pain on numeric rating (2.2±1.4), these results are matched with the results of **Samaneh et al., (2011)** about effects of distraction on physiologic indices and pain intensity in children aged 3-6 undergoing IV injection and found that the mean pain score based on

the numerical scale was 5.60 ± 3.13 in the control group, 1.60 ± 1.75 in the bubble-making group and 1.85 ± 1.42 in the breathing exercise group and also found a significant difference in the mean pain scores based on numeric scale between the control group and other groups after the injection,

The current study revealed that, only 3(10.0%) of children in cartoon group got severe pain this may be related to effectiveness of cartoon technique in reduction the concentration of the children undergoing venipuncture.

The results of the current study showed that, there was a highly significant difference among control, bubbles and cartoon groups regarding the intensity of pain on WBFS where (56%) of children in cartoon group reported no hurt in intensity of pain. This result is in agreement with the study conducted by **McLaren & Cohen, (2005)** about a comparison of distraction strategies for venipuncture distress in children and reported that, children in the movie condition were significantly less distressed than children in the control condition ($p < .001$) and found that, a cartoon movie decreased pain and distress in children during injection.

Bellieni et al. (2008), in his study about analgesic effect of watching TV during venipuncture and found that, there was reduction in the pain of catheter in children's of school age using distraction methods. Also the results of the study of **Sinha et al. (2006)** who mentioned in his study about evaluation of non pharmacologic methods of pain and anxiety management for laceration repair in the pediatric emergency department pediatrics that distraction could reduce the pain of stitching in children under 10 years old.

Esmaeili et al. (2008) also found in his study about comparing the efficacy of breathing exercises and music to reduce pain during the administration of blood vessels

that, bubble-making reduced children's pain significantly. The results were in the same line with **Alavi et al. (2008)** who reported in his study about pediatric pain management by nurses in educational hospitals of Shahrekord that, bubble-making during injection as compared to the usual method can reduce children's pain.

On the other hand, These results are in disagreement with the results of **Bagnasco et al., (2012)** who mentioned in his study about distraction techniques in children during venipuncture that no significant differences were found in the mean pain scores. Also, **Samaneh et al., (2011)** found in his study about effects of distraction on physiologic indices and pain intensity in children aged 3-6 undergoing IV injection that, the difference in the mean pain scores between the groups of experiment after the injection was not significant

In the current study the mean scores of children fear rated by the children were $2.2+1.4$, $1.2+1.4$ and $1.2+0.4$ in the control, bubbles and distraction groups respectively which may be related to that, distraction has the ability to separate the connection between person and his/her emotional pain that decreases the fear level.

These results are supported by the study conducted by **(Pandani, 2011)** to evaluate cartoon movie viewing as a practical and low-cost intervention to decrease burned children's pain behavior during dressing changes and found that, significant effect of cartoon movie distraction on observed behavioral distress in children.

Conclusion:

From the results of this study. It is concluded that, non pharmacological methods are effective distraction techniques to relieve pain and fear among children undergoing venipuncture.

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Recommendation:

Application of the practice of cartoon and bubbles distraction during intravenous injection is recommended among nurses working in the care of children in order to reduce pain and fear related to intravenous injection.

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