



# Effectiveness of distraction during intravenous cannula administration on discomfort among children

UMAMAHESWARI PAKKIRISAMY<sup>1</sup>, PROF. DR. PRADEEP V.S<sup>2</sup>

<sup>1</sup>Research Scholar, Malwanchal University, Indore, M.P., India.

<sup>2</sup>Research Supervisor, Department of Nursing, Malwanchal University, Indore, M.P., India.

**Abstract:** Most children who seek hospital care present with or experience pain or discomfort during the evaluation and treatment. Hence, the most favorable assessment and treatment of pain is the ultimate need of this population. Non-pharmacological pain management methods are helpful adjuncts to analgesics in treating pain in children. Several techniques have been suggested in the literature: distraction, play therapy, having parents present, positioning, etc. Distraction is not a matter of tricking the child into not paying attention to the pain; it is more pleasant and exciting. In current treatment modalities, IV cannula administration in children is an unavoidable procedure which also causes unpleasant experiences for children in the hospital. So, nurses must use distraction techniques to reduce children's pain during IV cannula administration. The present study evaluated the effectiveness of distraction during intravenous cannula administration on discomfort among children in a selected hospital, Lucknow, U.P. A systematic sampling technique was used to collect data from thirty children who were undergone IV cannula administration. The quantitative true experimental post-test design was used to evaluate the effectiveness of distraction. The overall discomfort level in the experimental group, the mean value was 6.00 with a standard deviation of 2.23. In the control group, the mean value was 3.06, with a standard deviation of 2.01. Moreover, the overall mean difference was 2.94 with t value of 3.77. This shows that the reduction in discomfort level among children in the experimental group was statistically significant ( $P < 0.05$ ).

**Key words:** Distraction, IV cannula administration, Pain, Discomfort, Children

## 1. INTRODUCTION

Pain, known as the "fifth vital sign," needs proper monitoring and management by medical specialists [Pozza et al., 2021]. Pain is both an emotional and physical experience. So pain is an elusive phenomenon in any clinical setting. However, in the pediatric unit, it's accurate identification and effective management pose special challenges to nurses as well as care givers [Mathews, 2011]. One of the most common adverse stimuli that children in hospitals experience owing to disease, injury, and necessary medical procedures is acute pain. Pediatric patients may experience acute pain as a result of needle insertion to provide medication, remove a blood sample, etc. Therefore, pain must be evaluated and treated as a subjective, multifactorial experience. A multimodal strategy and suitable assessment tools are absolutely necessary for the treatment of paediatric pain [Manocha & Taneja, 2016]. One of the most frequent procedures performed on children is venipuncture; millions of children go through this treatment, which is very upsetting. Children consider these procedures to be terrifying and a significant cause of pain [Katende & Mugabi, 2015].

All types of pain are treated with various pharmacological agents by administering injections or oral medications, making it uncomfortable for children. In order to effectively manage children's pain, it is also crucial to have different therapeutic approaches, such as non-pharmacological therapies, without inducing painful experience [Gokhale, 2017]. Distraction is a nonpharmacological strategy that uses various tactics to divert a children's attention from the pain. Distraction techniques for pain management can shorten procedure times and require less staff [Balanyuk et al., 2018]. It does not cost money and lacks the negative side effects of other pharmaceutical painkillers [Vetri Buratti et al., 2015].

### 1.1. Significance of the study

Routine medical procedures often used to assess and treat children can cause substantial pain and grief [Fein et al., 2012]. Pain, regardless of the source or patient age, can compromise a child's physical and psychological well-being and cause stress for parents; also, if left untreated, it can have short- and long-term consequences, including sensitization to pain episodes later in life [Slater et al., 2010].

It is estimated that up to 25% of adults fear needles, with most fears developing in childhood. About 10% of the population avoids vaccination and other needle procedures because of needle fears [Taddio et al., 2010]. Untreated childhood pain may delay recovery, interfere with brain development, cause chronic pain, and increase the risk of developing an opiate addiction in later life [Motluk, 2019]. Pain exposure over time can lead to changes in pain sensitivity, anxiety, stress disorders, hyperactivity, attention deficit disorder, decreased social skills and self-destructive behavior patterns [Mathews, 2011].

Children claim that getting a needle is one of the worst and most uncomfortable experiences they have ever had, and they are constantly worried about getting needles in all medical situations [Taddio et al., 2014]. Throughout life, needle operations including venipunctures and vaccine injections are typical, especially in children. Others may experience intense pain and terror, while some children may view those pains as "mild" [Taddio et al., 2012]. Fear of needles is associated with a higher likelihood of experiencing physiological symptoms including seizures and dizziness. For the needle recipient, the medical professional, and the carers, these outcomes lead to a bad and possibly traumatic experience [McMurtry et al., 2015].

Distraction during a painful procedure facilitates communication between the staff and the child. This improves the recovery rate and reduces the level of pain. Nevertheless, nursing professionals do not consider distraction to reduce the children's pain. Even most medical personnel are not aware of the distraction techniques. The investigator felt a great need for distraction during IV cannula administration. Very few studies were done to assess the effectiveness of distraction during intravenous cannula administration on pain among children in an Indian setting. This provoked the investigator to select the study.

## 1.2. Statement of the problem

An experimental study to assess the efficiency of distraction during intravenous cannula administration on discomfort among children in selected hospital, Lucknow, U.P.

## 1.3. Objectives

- To assess the level of discomfort during intravenous cannula administration with distraction of experimental group.
- To assess the level of discomfort during intravenous cannula administration of control group.
- To assess the efficiency of distraction during intravenous cannula administration on discomfort among children.

## 1.4. Variables

### Independent variable:

The Independent variable of this study was distraction.

### Dependent variable:

The dependent variable of this study was discomfort level of children during IV cannula administration.

## 1.5. Hypothesis

There is a significant difference in the discomfort level during IV cannula administration between the children who received distraction and those who did not.

## 1.6. Delimitations of the study

- The sample size of the study was delimited to only 30.
- The study was delimited to children admitted in Chandra Hospital, Lucknow, U.P.
- The data collection period was delimited to four weeks.

## 2. MATERIALS AND METHODS

### 2.1. Research approach and design

The quantitative true experimental post-test design was used to assess the efficiency of distraction during intravenous cannula administration on discomfort perception among children.

### 2.2. Setting

This study was conducted in Chandra Hospital, Lucknow, U.P.

### 2.3. Population, Sample and sample size

The population of the present study consists of children who were prescribed for intravenous cannula administration. The sample of this study comprised children who were prescribed for intravenous cannula administration in Chandra Hospital, Lucknow, U.P. and the sample size was thirty.

### 2.4. Sampling technique

The samples for this study were chosen using a systematic random sampling technique. All of the odd and even numbers considered to experimental (15) and control group (15) respectively.

## 2.5. Criteria for sample selection

### *Inclusion criteria*

- Children who were prescribed for intravenous cannula administration in Pediatric wards.
- Children belonging to both the sex.
- Children in the age group of 2 years to 7 years.

### *Exclusion criteria*

- Children who were prescribed for various other painful procedures.
- Children who were admitted in the PICU.
- Children who were undergoing surgery during the study period.

## 2.6. Description of the tool

The tool consists of two parts, namely Part I- Demographic variables and Part II - Modified Markel et al. (1997) Face, Legs, Activity, Cry, Consolability (FLACC) scale.

Part I describes the demographic variables including age of the child in years, sex, mother's educational status, Father's educational status, child's previous exposure to intravenous cannula administration and source of information regarding reduction of pain in children. The investigator developed this part by referring to various textbooks, the internet and literature reviews.

Part II describes the Modified Markel et al. (1997) Face, Legs, Activity, Cry, Consolability (FLACC) scale. This scale was used to assess the level of discomfort during peripheral intravenous cannula access among children aged 2 years to seven years. The FLACC scale was scored between the ranges of 0 to 10. The scale has 5 criteria; each assigned a score of 0, 1 or 2. The score were interpreted as Relaxed and comfortable (0), Mild discomfort (1-3), Moderate discomfort (4-6) and Severe discomfort (7-10).

## 2.7. Intervention

Distraction was given for 10 minutes from the preparation of the child to completion of intravenous administration by the children's mother or caregivers. Age related distraction activities provided during IV cannula administration were Electronic toys, , Hand-held Video games, Musics, Touch and feel toys, Hand or finger puppets, Coaching/talking, Cartoon movies, Soap bubbles, etc.

## 2.8. Data collection procedure

Formal Permission for conducting a research study was obtained. The thirty (30) children prescribed for intravenous cannula administration were divided into experimental and control groups using a systematic random sampling technique. All children of odd and even numbers were considered the experimental and control groups, respectively.

At the very beginning, all parents received information about the study's significance and signed a consent form. For the experimental group of parents, the investigator explained the method of administration of distraction according to the age of the child and collected the demographic variables. Then one parent started to get distracted from preparing the child to completing intravenous administration for about 10 minutes. At the time of IV cannula administration, the level of discomfort was assessed by the investigator using a modified FLACC scale. After collecting the demographic variables for the control group, the level of discomfort during IV cannula administration was assessed by the investigator using the same scale without giving distraction therapy.

The data were analyzed by using descriptive and inferential statistics. The results were interpreted.

## 3. RESULTS

### 3.1. Demographic variables of children.

Table No. 1 shows the distribution of demographic variables of children.

**Table No. 1: Distribution of demographic variables of the children.**

SL. NO.	DEMOGRAPHIC VARIABLES	N=30	
		FREQUENCY	PERCENTAGE
1.	Age of the child in years		
	a. 2-3	09	30.00
	b. 4-5	11	36.67
	c. 6-7	10	33.33
2.	Sex		
	a. Male	09	30.00
	b. Female	21	70.00
3.	Mother's educational status		
	a. Primary	05	16.67
	b. Secondary	07	23.33
	c. Higher Secondary	12	40.00
	d. Degree and above	06	20.00

4.	Father's educational status		
	a. Primary	05	16.67
	b. Secondary	07	23.33
	c. Higher Secondary	11	36.67
	d. Degree and above	07	23.33
8.	Previous exposure to intravenous cannula administration		
	a. Yes	09	30.00
	b. No	21	70.00
10.	Source of information regarding reduction of pain in children		
	a. Mass media	05	16.67
	b. Friends /relatives	18	60.00
	c. Health professionals	07	23.33

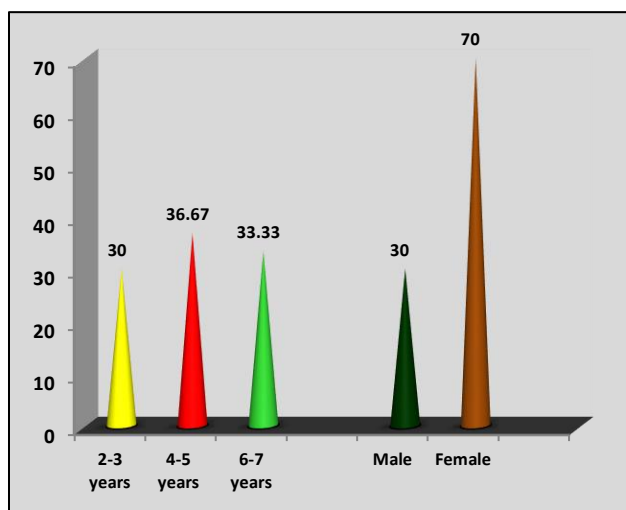


Fig. 1: Distribution of age and sex of children.

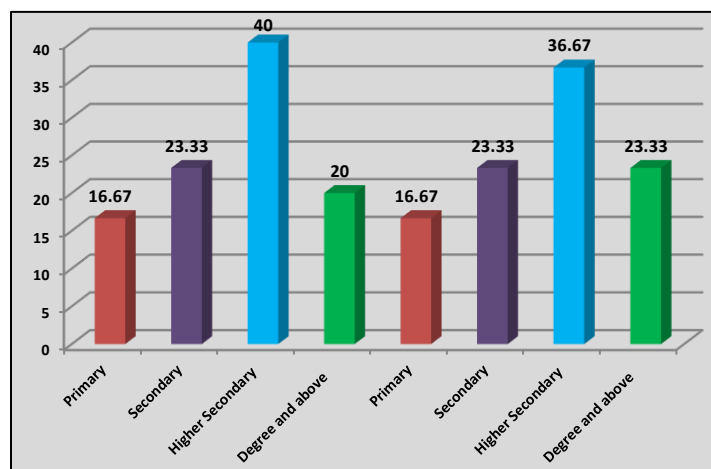


Fig. 2: Distribution of educational status of mother and father.

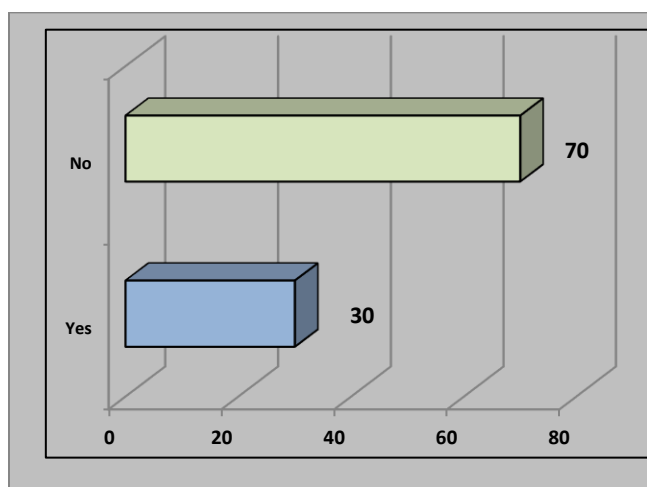


Fig.3: Previous exposure to IV cannula administration.

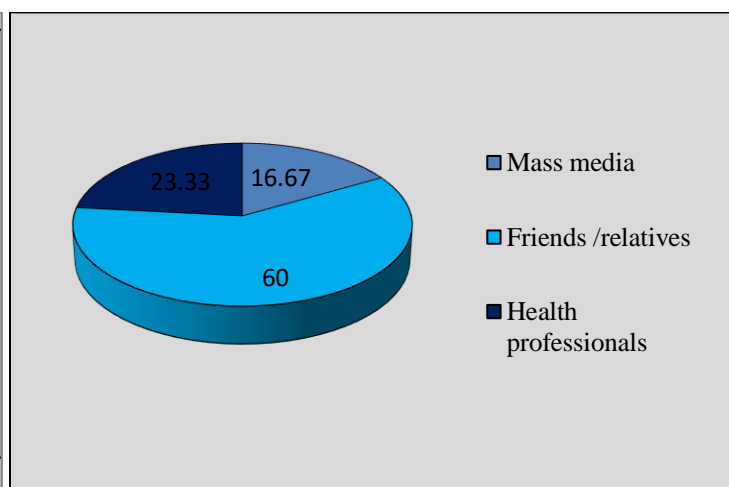


Fig. 4: Source of information regarding reduction of pain in children.

### 3.2 Discomfort level of experimental group of children.

Table No. 2 shows the distribution of discomfort level during intravenous cannula administration with distraction in the experimental group of children. The results reveal that three (20%) children were relaxed and comfortable during IV cannula administration in the experimental group with distraction. Six (40%) children had mild discomfort. Also, six (40%) children had moderate discomfort. And no one had severe discomfort.

**Table No. 2: Distribution of discomfort level during intravenous cannula administration with distraction of experimental group of children.**

SL. NO.	LEVEL OF DISCOMFORT	EXPERIMENTAL GROUP (N=15)	
		FREQUENCY	PERCENTAGE
1.	Relaxed and comfortable (0)	03	20.00
2.	Mild discomfort (1-3)	06	40.00
3.	Moderate discomfort (4-6)	06	40.00
4.	Severe discomfort (7-10)	00	00.00

**3.3 Discomfort level of control group of children.**

Table No. 3 shows the distribution of discomfort level during intravenous cannula administration in the control group of children. The control group's results revealed that, without distraction, three (20%) and five (33.33%) children had mild and moderate discomfort, respectively, during IV cannula administration. Seven (46.67%) children had severe discomfort.

**Table No. 3: Distribution of discomfort level during intravenous cannula administration of control group of children.**

SL. NO.	LEVEL OF DISCOMFORT	EXPERIMENTAL GROUP (N=15)	
		FREQUENCY	PERCENTAGE
1.	Relaxed and comfortable (0)	00	00.00
2.	Mild discomfort (1-3)	03	20.00
3.	Moderate discomfort (4-6)	05	33.33
4.	Severe discomfort (7-10)	07	46.67

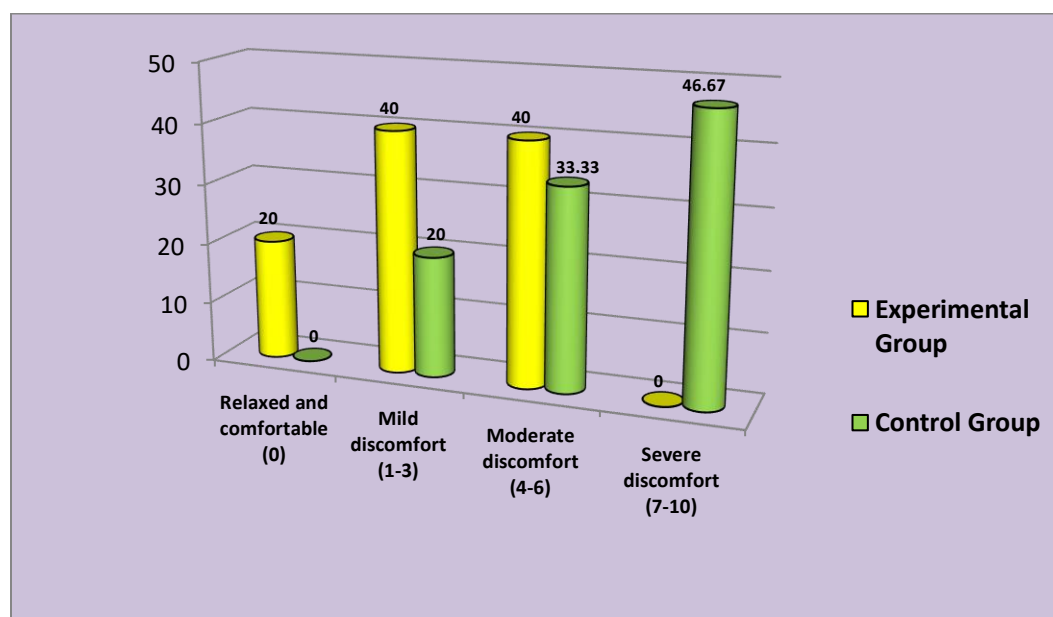
**3.4 Efficiency of distraction during intravenous cannula administration on discomfort among children.**

The overall discomfort level in the experimental group, the mean value was 6.00, with a standard deviation of 2.23. In the control group, the mean value was 3.06, with a standard deviation of 2.01. Moreover, the overall mean difference was 2.94 with t value of 3.77. This shows that the reduction in discomfort level among children in the experimental group was statistically significant ( $P < 0.05$ ). Table 4 and Fig. No. 4 show the difference between the experimental and control groups.

**Table No. 4: Efficiency of distraction during intravenous cannula administration on discomfort among children.**

SL. NO.	GROUP	MEAN	STANDARD DEVIATION	STANDARD ERROR OF THE MEAN	MEAN DIFFERENCE	'T' TEST VALUE & P- VALUE
1.	Experimental Group	6.00	2.23	0.57	2.94	t = 3.77 (P = <0.05) S
2.	Control Group	3.06	2.01	0.52		

Note: S- Significant

**Fig. 4: Distribution of level of discomfort among children in experimental and control group.**



#### 4. DISCUSSION

The experimental group results reveal that three (20%) children were relaxed and comfortable during IV cannula administration with distraction. Six (40%) children had mild discomfort. Also, six (40%) children had moderate discomfort. And no one had severe discomfort. The control group's results revealed that, without distraction, three (20%) and five (33.33%) children had mild and moderate discomfort, respectively, during IV cannula administration. Seven (46.67%) children had severe discomfort. Also, this study results revealed that, means difference of discomfort score between experimental and control group was 2.94 with t value 3.77. This shows that the reduction in the level of discomfort among children in the experimental group was statistically significant ( $P < 0.05$ ). The overall findings of the study revealed that significant changes occurred during intravenous cannula administration on discomfort level among children. Hence the hypothesis stated at the beginning of this study is confirmed. This study result has also correlated with the study conducted by Talwar et al., 2014. It was a quasi-experimental study to evaluate the efficacy of distraction techniques in reducing the level of pain among healthy children receiving vaccination at a well-baby clinic in a selected hospital, Ludhiana. During vaccination, a sound and light-producing movable toy were used as a distraction technique in the experimental group. Video recording of the children receiving vaccination was done and the pain score was calculated. Findings revealed that 7% of the children in experimental group as compared to only 1% in control group experienced no pain during vaccination. They concluded that, distraction technique significantly reduces pain in healthy children receiving a vaccination ( $p < 0.05$ ).

#### 5. CONCLUSION

Exposure to pain during the procedure by children also increases parents' anxiety, distress, stress, and other somatic symptoms, leading to children's increased perception of pain. The occurrence of pain in pediatric patients during their inpatient stay can also lead to short and long-term functional and emotional problems for themselves and their families. So, distraction therapy eases the mind of both children and parents from pain or discomfort.

#### ACKNOWLEDGMENT

I am privileged to express my sincere gratitude to the children of Chandra Hospital, Lucknow, U.P. for participation in research study as a sample.

#### SOURCE OF FUNDING

The author did not receive any financial support from any third party related to the submitted work.

#### CONFLICT OF INTEREST

The author has no conflict of interest to declare.

#### REFERENCES

- [1]. Balanyuk, I., Ledonne, G., Provenzano, M., Bianco, R., Meroni, C., Ferri, P., & Bonetti, L. (2018). Distraction technique for pain reduction in Peripheral Venous Catheterization: randomized, controlled trial. *Acta Bio Medica: Atenei Parmensis*, 89(Suppl 4), 55. <https://doi.org/10.23750/ABM.V89I4-S.7115>
- [2]. Fein, J. A., Zempsky, W. T., Cravero, J. P., Shaw, K. N., Ackerman, A. D., Chun, T. H., Connors, G. P., Dudley, N. C., Fuchs, S. M., Moore, B. R., Selbst, S. M., Wright, J. L., Bannister, C. F., Tobias, J. D., Anderson, C. T. M., Goldschneider, K. R., Koh, J. L., Polaner, D. M., & Houck, C. S. (2012). Relief of pain and anxiety in pediatric patients in emergency medical systems. *Pediatrics*, 130(5). <https://doi.org/10.1542/PEDS.2012-2536>
- [3]. Gokhale, S. G. (2017). "Non-Pharmacological Methods for Pain Management." *JOJ Nursing & Health Care*, 4(4). <https://doi.org/10.19080/JOJNHC.2017.04.555642>
- [4]. Katende, G., & Mugabi, B. (2015). Comforting strategies and perceived barriers to pediatric pain management during IV line insertion procedure in Uganda's national referral hospital: A descriptive study. *BMC Pediatrics*, 15(1). <https://doi.org/10.1186/S12887-015-0438-0>
- [5]. Manocha, S., & Taneja, N. (2016). Assessment of paediatric pain: A critical review. *Journal of Basic and Clinical Physiology and Pharmacology*, 27(4), 323–331. <https://doi.org/10.1515/JBCPP-2015-0041/PDF>
- [6]. Mathews, L. (2011). Pain in Children: Neglected, Unaddressed and Mismanaged. *Indian Journal of Palliative Care*, 17(Suppl), S70. <https://doi.org/10.4103/0973-1075.76247>
- [7]. McMurtry, C. M., Riddell, R. P., Taddio, A., Racine, N., Asmundson, G. J. G., Noel, M., Chambers, C. T., & Shah, V. (2015). Far from "just a poke": Common painful needle procedures and the development of needle fear. *Clinical Journal of Pain*, 31(10), S3–S11. <https://doi.org/10.1097/AJP.0000000000000272>
- [8]. Motluk, A. (2019). Poorly managed childhood pain can have lifelong consequences. *CMAJ*, 191(27), E771–E772. <https://doi.org/10.1503/CMAJ.109-5768>
- [9]. Pozza, D. H., Azevedo, L. F., & Lopes, J. M. C. (2021). Pain as the fifth vital sign—A comparison between public and private healthcare systems. *PLOS ONE*, 16(11), e0259535. <https://doi.org/10.1371/JOURNAL.PONE.0259535>

- [10]. Slater, R., Fabrizi, L., Worley, A., Meek, J., Boyd, S., & Fitzgerald, M. (2010). Premature infants display increased noxious-evoked neuronal activity in the brain compared to healthy age-matched term-born infants. *NeuroImage*, 52(2), 583–589. <https://doi.org/10.1016/J.NEUROIMAGE.2010.04.253>
- [11]. Taddio, A., Appleton, M., Bortolussi, R., Chambers, C., Dubey, V., Halperin, S., Hanrahan, A., Ipp, M., Lockett, D., MacDonald, N., Midmer, D., Mousmanis, P., Palda, V., Pielak, K., Pillai Riddell, R., Rieder, M., Scott, J., & Shah, V. (2010). Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. *CMAJ: Canadian Medical Association Journal*, 182(18), E843. <https://doi.org/10.1503/CMAJ.101720>
- [12]. Taddio, A., Ilersich, A. F., Ilersich, A. N., & Wells, J. (2014). From the mouth of babes: Getting vaccinated doesn't have to hurt. *The Canadian Journal of Infectious Diseases & Medical Microbiology*, 25(4), 196. <https://doi.org/10.1155/2014/470261>
- [13]. Talwar, R., Yadav, A., Deol, R., & Kaur, J. (2014). Efficacy of distraction technique in reducing pain among children receiving vaccination. *Int J Cur Res Rev*. <http://www.fda.gov/downloads/BiologicsBlood->
- [14]. Vetri Buratti, C., Angelino, F., Sansoni, J., Fabriani, L., Mauro, L., & Latina, R. (2015). Distraction as a technique to control pain in pediatric patients during venipuncture. A narrative review of literature. *Professioni Infermieristiche*, 68(1), 52–62. <https://doi.org/10.7429/PI.2015.681052>