

# Effect of Acupressure at LI-4 Level on Intensity of Pain during Intravenous Cannula Insertion among Children of 1-6 Years



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## Abstract

In India 86 out of 100 hospitalized children undergo intravenous cannula insertion and 77% of them face severe pain during cannula insertion or venipuncture. Non pharmacological support for pain relief can be provided when it is expected to be minimal or of short duration. The main aim of this study was to identify the effect of acupressure at LI-4 level, on intensity of pain during intravenous cannula insertion among children of 1-6years at selected hospitals of Indore. An experimental two group post-test only design was adopted in the study. The population consisted of 40 children of 1-6years of age who were selected through convenient sampling, than randomly assigned to the experimental and control groups. FLACC pain scale was used for assessment of intensity of pain and questionnaire was used for collecting socio demographic data and clinical variables. The experimental group was given acupressure at LI-4 pressure point for 5 minutes prior and throughout the insertion of cannula and in control group routine care was given. Findings revealed that the mean difference of intensity of pain between the experimental and control group was 4.07. Computed t value 12.73 at df 38 and table value 2.02 with SD  $\pm 1.033$  which indicates that there was a significant difference between scores of intensity of pain among experimental group and control group at the level  $p < 0.005$ . Study concluded that acupressure on pain during intravenous cannula insertion was effective.

**Keywords:** Effectiveness, Children, Intravenous cannula insertion, Acupressure, Pain

## Background

Intravenous cannula insertion is one of the common painful procedures done in the hospital wards for treatment. Almost all the children undergoing intravenous cannula insertion have moderate to severe pain. The acute pain due to venipuncture is a complex phenomenon. Children's experience of pain is recognized as one of the most complex human stressors, which may have consequences for later pain related behaviour and perception. Despite an increase in research on pain in children, studies still report hospitalized children experiencing unacceptable levels of pain (**Lawrence J, Alcock D et.al2004**)<sup>1</sup>. It is preferable to use simple effective pain relieving interventions to reduce the distress.

There is a need for effective combinations of non-pharmacological and pharmacological interventions to

deal with procedure related pain. Effective pain management could reduce the harmful and longstanding negative effects of pain related to medical and surgical procedures (**Finley GA, McGrath PJ. 2004**)<sup>2</sup>.

The gentle art of acupressure is easy to do for a sick or child experiencing pain. Massaging an acupressure point will help to relieve symptoms present in the child. Acupressure can be applied directly to parts of the child's body. Acupressure is a Chinese manipulative therapy in which points are stimulated by pressure, using hands, fingers and thumbs. Acupressure supposedly promotes the circulation of blood, thus maintaining the normal functions of the human body and enhancing well being. So health workers use acupressure for reducing several types of pain (**NeginMasudiAlvai, 2010**)<sup>3</sup>. Acupressure for pain works according to the principle of Gate control theory; acupressure is a motor activity which generates

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nerve impulses which reaches dorsal horn of the spinal cord. LI4 point contains cluster of large diameter nerve fibres that is non nociceptive fibres, acupressure at LI 4 point generate competing stimulus of large fibers and effectively block the slow pain signals from reaching the brain, blocking the pain pathway. **Janet Z, L. Royal (1994)**<sup>4</sup>

### **Need of the Study & Literature Review**

Several non-pharmacological interventions have been tried to reduce pain, anxiety and distress associated with injection. The intervention such as breathing techniques, acupressure, massage, simple imagery, kaleidoscope, music, and videogames have been proved and provided to have some effect in attenuated behavioral distress in children.

A study was conducted to estimate the level of pain perception after intravenous cannula insertion among male children and female children. A total of 100 subjects were taken. Visual analogue scale was used to quantify the pain immediately after intravenous cannula insertion using 20G needle. Result showed that 64% female had moderate to severe pain (5-10) as compared with males of 58%. **Sparks L. (2006)**<sup>5</sup>

A single blind randomized study was conducted in Japan to compare the effect between LI 4 acupressure and LI 4 cold application on children age 5-12 yrs to reduce pain of intravenous cannula insertion. This controlled trial provides preliminary evidence that acupressure has greater effect on pain during intravenous cannula insertion in children than cold application. **(Mitchell JR, Whitney FW, 2006)**<sup>6</sup>

The pharmacological measures used for pain management cause over stimulation and are expensive. And other non pharmacological methods such as toys, television, cartoons require extra resources and manpower. And some of them can lead to infection. Acupressure is an easy and convenient method of pain management, as it is easy to carry out and needs less manpower, no equipment is needed and there is no risk for infection. Thus the investigator decided to take up this study to assess the effectiveness of acupressure as an alternative technique among hospitalized children

subjected to IV cannula insertion procedure to relieve pain.

### **Problem Statement**

“An experimental study to assess the effectiveness of acupressure at LI-4 level on intensity of pain during intravenous cannula insertion in children of 1-6yrs admitted in selected hospital of Indore in the year 2012-2013”

### **Objectives**

To assess the intensity of pain during intravenous cannula insertion in experimental group & control group.

To determine the association between the intensity of pain & site of cannula insertion in control group.

To compare the intensity of pain during the intravenous cannula insertion in experimental group & control group.

### **Hypotheses**

**H1:** There is significant association between the intensity of pain during intravenous cannula insertion and site of cannula insertion among experimental group at the level  $p \leq 0.05$

**H2:** There is significant association between the intensity of pain during intravenous cannula insertion and site of cannula insertion among control group at the level  $p \leq 0.05$

**H3:** There is a significant difference in the intensity of pain during intravenous cannula insertion between experimental and control group at the level  $p \leq 0.05$ .

### **Methodology**

**Research Design:** Experimental, two group - post test only design

**Setting:** The study was conducted at paediatric unit of Choithram Hospital & research centre

**Population:** It comprised of Children 1-6yrs undergoing intravenous cannula insertion.

**Sample and sample size:** Sample comprised of total 40

children of 1-6yrs undergoing intravenous cannula insertion admitted in Choithram Hospital and Research Centre. 20 in each experimental & control group.

**Sampling technique:** Convenient sampling was used to select the children 1-6yrs undergoing intravenous cannula insertion admitted in Choithram Hospital and Research Centre Indore. Samples were then assigned to experimental and control group by random (envelope) method.

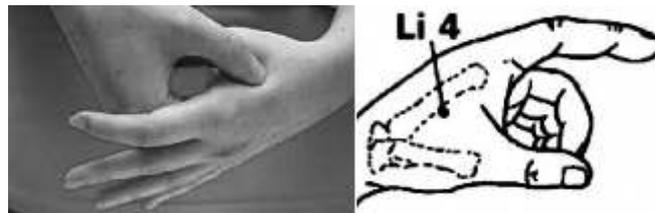
**Tool:** Tools used in the study were:

Structured questionnaire to collect socio demographic data & clinical variables

Standardized FLACC behavioural pain scale. It included 5 parameters- Facial expression, movement of legs, activity, cry, and consolability.

**Validity and Reliability:** The prepared tool was given to 9 experts for establishing content validity. Reliability of the standardized FLACC SCALE was extracted through exact agreement and kappa statistics,  $r = 0.85$  support excellent inter-rater reliability of the tool. (Lewis TV, ZanottiJ, et al 2010)

**Data Collection Procedure:** Written permission was obtained from the administrative authority of the hospital. The investigator informed the cannula nurse who performs intravenous cannula insertion about the study. Informed consent was obtained from the parents of the children who needed to undergo intravenous cannula insertion. The samples were randomly assigned to the experimental or control group using envelope method. The samples of experimental group were provided a comfortable sitting or lying position with elbows resting on the desk and acupressure was done on the LI 4 point of other hand, where intravenous cannula insertion was not done. All the samples had undergone intravenous cannula insertion by the same cannula nurse. Acupressure was given to the sample of experimental group for 5 minutes prior and throughout the procedure of insertion of cannula at the LI-4 pressure point and the pain intensity was monitored using FLACC scale and verbal feedback was taken only from those children who had undergone intravenous cannula insertion previously.



**Figure- 1 representing the LI 4 point for the site of acupressure**

In control group, the investigator monitored the pain intensity while the cannula nurse performed intravenous cannula insertion; no specific interventions were given for distraction.

## Findings

The data were analyzed according to the objectives of the study using descriptive and inferential statistics.

### Section 1: Socio-demographic Data.

Findings revealed that among experimental group, majority of samples 12 (60%) were in the age group of 4-6 years of age, and 8 (40%) of the samples were in the age group of 1-3 years of age, whereas in control group, more than half 11 (55%) were in the age group of 4-6 years of age, and near about half of the sample 9(45%) were in the age group of 1-3 years of age. In experimental group, more than half of the sample 11(55%) were male and 9 (45%) were females and in control group 12 (60%) were male.

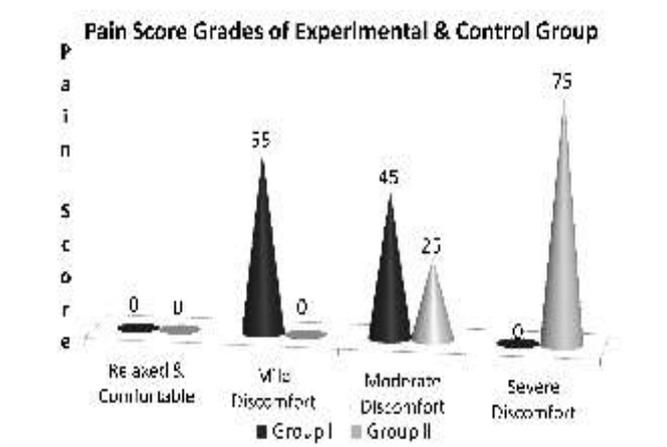
With regard to child's reaction towards health personnel in experimental group none of them accepted the health workers easily without any resistance. Majority of the sample that is 12(60%) were totally reluctant in accepting them whereas 8 (40%) showed withdrawal with minimal resistance. In control group, three fourth 15(75%) were totally reluctant to accept them while one fourth that is 5(25%) of the samples reaction towards health personnel was withdrawal with minimal resistance.

### Section II: Assessment of clinical variables.

Results revealed that, in experimental group near about three fourth, 14 (70%) children were not admitted in hospital previously. In control group more than half 12 (60%) children were not admitted in hospital previously. Entire samples of experimental group as well as control

group had medical diagnosis. In experimental group majority 17(85%) were having acute illness while a few of them 3(15%) were having chronic illness and among the 20 samples of control group most of them, 16(80%) were having acute illness and 4(20%) were having chronic illness. Among experimental group half of the samples, 10 (50%) had undergone intravenous cannula insertion in accessory vein and 8(40%) had in the dorso venous arch and 2(10%) in cubital veins. In experimental group, half of the samples 10 (50%) had intravenous cannula insertion in the accessory vein, 9 (45%) had in dorso venous arch and one (5%) among the control group had intravenous cannula insertion in the cubital vein.

**Section III: Frequency and percentage distribution of pain score grades of experimental group and control group.**



**Figure 2 - Conical diagram showing distribution of pain score grades**

Figure 1 reveals that in experimental group none of them were in severe discomfort during intravenous cannula insertion while in control group 15(75%) were in severe discomfort state. In experimental group more than half of them that is 11 (55%) had mild discomfort and none of them was found in control group. In experimental group 9(45%) were moderately discomfort while 5(25%) were moderately discomfort in control group. None from both the groups were relaxed and comfortable.

**Section IV: Association between the intensity of pain during intravenous cannula insertion and site of cannula insertion in experimental group and control group.**

**Table No 1: Association between the intensity of pain and selected clinical variable of experimental group**

N<sub>1</sub>=20

Clinical variable	No pain	Mild pain	Moderate pain	Severe pain	df	X <sup>2</sup>	Table Value
Site of Cannula insertion							
Dorsovenous arch	0	4	4	0	2	.202	5.99
Accessory veins	0	6	4	0			
Cubital veins	0	1	1	0			

**NS- Non Significant**

Data presented in Table No.1 shows that in relation to the site of cannula insertion, the chi-square .202 at df 2 and table value 5.99 shows that there is no significant association of site of cannula insertion and pain intensity in experimental group. Hence H<sub>1</sub> is rejected.

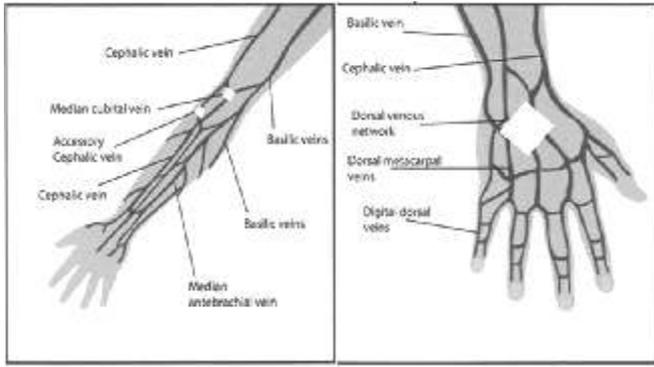
**Table No 2: Association between the intensity of pain and site of cannula insertion in control group**

N<sub>2</sub>=20

Clinical variable	No pain	Mild pain	Moderate pain	Severe pain	df	X <sup>2</sup>	Table Value
Site of Cannula insertion							
Dorsovenous Arch	0	0	5	4	2	8.148	5.99
Accessory veins	0	0	0	10			
Cubital veins	0	0	0	1			

p<0.05\* p<0.01\*\* p<0.001\*\*\* S- Significant

Data presented in Table No 2 shows that in relation to the site of cannula insertion, it was found that in accessory veins, pain intensity was severe, whereas at the site of Dorso-venous arch the pain intensity was moderate. The association between the intensity of pain and site of cannula insertion in control group was found significant with chi-square value 8.148 at df 2 and the table value 5.99. Hence H<sub>2</sub> is accepted.



**Figure- 3** representing the veins of upper arm i.e Dorsal venous arch, Accessory vein and Medial cubital vein for the site of I/V cannula insertion.

**Section V: Effectiveness of acupressure at LI 4 point on pain during intravenous cannula insertion.**

**Table No. 3: Comparison of post test score of intensity of pain in experimental and control group.**

N=40

Groups	Mean	Mean Diff.	SD	SE	df	t Value	Table Value
Experimental Group	3.68	4.07	1.033	0.325	38	12.73	2.02
Control group	7.75						

p < 0.05\* p < 0.01\*\* p < 0.001 \*\*\*S - Significant

Data presented in Table No 3 depicts that the computed t value 12.73 at df 38 and table value 2.02 with SD 1.033 indicates that there is a significant difference between post test score of intensity of pain among experimental group and control group at the level  $p \leq 0.001$ . Thus, there is a significant difference in intensity of pain during intravenous insertion between the experimental group control groups. Thus H3 is accepted

**Discussion**

**Effect of acupressure on pain during intravenous cannula insertion**

The pain intensity during cannula insertion was checked in both experimental group and control group. Findings of the study revealed that, in the experimental group, mean pain score 11.806 is less than mean pain score in control group, 10.58. Calculated mean difference was 4.07 and

SD was 1.033. Computed t' value ( $t_{38} = 12.73$ ) was highly significant at  $p \leq 0.05$  level. Thus there is a significant effect of acupressure on pain during intravenous cannula insertion. Thus the research hypothesis  $H_3$  is accepted.

Above findings are supported by the study conducted by **Mitchell JR, Whitney FW.(2010)<sup>6</sup>** where a single blind randomised design was undertaken to examine a comparison between LI 4 acupressure and LI 4 cold application on children to reduce pain of intravenous cannula insertion. A single blind randomized experimental study was used. Children of age 5-12 yrs were selected (N=134) randomly assigned to experimental groups of LI4 (n = 47) and cold application using ice cubes (n = 47) received LI 4 acupressure and LI 4 cold application respectively, 10 minutes prior and during the insertion of intravenous cannula. Faces pain Scale was used for the data collection. Results concluded that the LI-4 acupressure was more effective than cold application with the mean difference  $2.8 \pm 2$ . This controlled trial provides preliminary evidence that acupressure has greater effect on pain during intravenous cannula insertion in children.

**Conclusion**

The present study attempted to find out the efficacy of acupressure on pain intensity during intravenous cannula insertion. The results were analyzed in terms of the differences seen in the experimental group with acupressure and control group. Results showed that there was a significant difference between the pain intensity in experimental and control group. The acupressure therapy does not pose any harmful effect on the health status of the children if done properly as per proper instruction. It is economical as well as free of side effects but requires accuracy. Hence on the basis of the above cited findings, it could be concluded that acupressure can be used to reduce pain in intravenous cannula insertion in children. In the present study in relation to the site of cannula insertion, it was also found that the pain intensity was severe in accessory veins, whereas at the site of Dorso-venous arch, the pain intensity was moderate but pain intensity was minimum in most of the children at cubital vein. Therefore it suggests that cubital veins should be preferred by nurses for I/V

cannula insertion. (Fig.3)

### References

1. Lawrence J, Alcock D, McGrath P, Kay J, MacMurray SB, Dulberg C. Pediatric pain perception. *Neonatal Netw.* 2004; 12:59-66. Available from: [www.ncbi.nlm.nih.gov/pubmed/8413140](http://www.ncbi.nlm.nih.gov/pubmed/8413140)
2. Finley GA, McGrath PJ, editors. *Acute and procedure pain in infants and children.* Seattle: IASP Press; 2004. Available from: <http://www.sickkids.ca/Research/I-OUCH/Publications/Pain-Management.htm>
3. NeginMasoudiAlvai. Effectiveness of acupressure to reduce pain in intramuscular injections. *Acute pain journal [serial online]* 2010 Nov 26 [cited 2010 sep 24] Available from: URL: [http://www.acutepainjournal.com/article/S1366-0071\(07\)00168-4/abstract](http://www.acutepainjournal.com/article/S1366-0071(07)00168-4/abstract)
4. Janet Z, L. *Royal pediatric Hospital; Department of pediatric medicine. Smart medicine for a healthier child: 1994, Ontario.* Available from : [www.books.Google.co.in/books/isbn=1583331395](http://www.books.Google.co.in/books/isbn=1583331395)
5. Sparks L, Taking the "ouch" out of injections for children: using distraction to decrease pain. *MCN Am J Matern Child Nurs* 2001, Available from <http://www.ncbi.nlm.nih.gov/pubmed/11265439>
6. Mitchell JR(1), Whitney FW, *AAOHN Journal.* The effect of injection speed on the perception of intramuscular injection pain. A clinical update. . 2001 Jun;49(6):286-92 Available from: [www.ncbi.nlm.nih.gov/11760527](http://www.ncbi.nlm.nih.gov/11760527)
7. Jarmey, Chris and John Tindall. *Acupressure for Common Ailments.* London: Gaia, 1991
8. Lynch, ME., Campbell, FA., Clark, AJ., Dunbar, MJ., Goldstein, D., Peng, P., Stinson, J., Tupper, H. & Canadian Pain Society Wait Times Task Force (2007). *Waiting for treatment for chronic pain a survey of existing benchmarks: toward establishing evidence-based benchmarks for medically acceptable waiting times.* *Pain Research & Management*, 12 (4), 245-52