

A study to assess the effectiveness of a Nurse-Led Cartoon Therapy on the level of pain during immunisation among preschool children in selected immunisation Center, Gurugram, Haryana.

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Informed Consent: Informed Consent was obtained from the participants.

Data and materials availability: Upon justifiable request, the corresponding author will make all of the data sets gathered during this investigation available

Abstract

Introduction:

Immunisation is a vital preventive healthcare measure that protects children from various infectious diseases and contributes significantly to reducing childhood illness and death. Although vaccination provides numerous health benefits, the procedure often causes pain, anxiety, fear, and discomfort, especially among preschool children. Painful experiences during Pain Rating Scale, and a Self-Structured Behavioural Response Checklist. The data were analysed using descriptive and inferential statistical methods such as frequency, percentage, mean, standard deviation, independent t-test, and chi-square test.

Methods:

The study adopted a quantitative research approach with a quasi-experimental post-test-only control group design and was conducted at SGT Hospital, Haryana, among preschool children aged 3–6 years. A total of 60 children were selected using non-probability purposive sampling, with 30 each in the experimental and control groups. Data were collected using a demographic data sheet, Wong-Baker FACES Pain Rating Scale, and a self-structured Behavioural Response Checklist. After obtaining permission and informed consent from parents/guardians, the intervention was administered to the experimental group, while the control group received routine care. Post-test data were collected from both groups following the intervention. Data were analysed using appropriate descriptive and inferential statistics to assess the effectiveness of the intervention.

Results:

The findings revealed that preschool children who received nurse-led cartoon therapy experienced lower pain levels compared to those who received routine care. The mean post-test pain score in the experimental group was 2.33 ± 0.66 , whereas the control group had a mean score of 3.67 ± 0.48 . Statistical analysis demonstrated a highly significant difference between the two groups ($t = 9.26$, $p < 0.001$). The majority of children in the experimental group reported lower pain intensity, while children in the control group experienced comparatively higher pain levels. Similarly, behavioural distress scores were lower among children who received the intervention. A significant association was observed between post-test pain level and time of procedure among preschool children in the experimental group.

Conclusion:

The study demonstrated that nurse-led cartoon therapy is an effective distraction technique for reducing pain and behavioural distress during immunisation among preschool children. As a simple, cost-effective, and non-invasive intervention, it can be incorporated into routine nursing practice to enhance children's comfort and promote a more positive immunisation experience.

Keywords:

Nurse-Led Cartoon Therapy, Immunisation, Pain, Preschool Children, Distraction Technique, Behavioural Distress, Non-Pharmacological Intervention.

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BACKGROUND OF THE STUDY

Immunisation may lead to crying, resistance, and negative attitudes toward future healthcare procedures. Therefore, managing procedural pain effectively is an important responsibility of healthcare professionals. Non-pharmacological methods are increasingly used to minimize pain and distress in children because they are safe, simple, and easy to implement. Distraction techniques are among the most commonly used approaches for reducing procedural pain. Cartoon therapy is a distraction-based intervention that engages children through entertaining cartoon content, helping to shift their attention away from the injection procedure. Considering its potential benefits, the present study was conducted to evaluate the effectiveness of nurse-led cartoon therapy on pain experienced during immunisation among preschool children in selected immunisation centres of Gurugram, Haryana.

NEED OF THE STUDY

The primary responsibility of nurses with respect to pain management during vaccination is ethical, as well as an obligation of the professional nurse. Painful history during immunisations could contribute to fears about needles, avoidance of healthcare settings, and lack of cooperation at future medical appointments. Thus, it is necessary to minimize the child's experience of pain at the time of immunisation not only for the purpose of immediate comfort but to give the child a positive healthcare experience and develop a willingness to return to the same healthcare facility for future treatment. Cartoon based audiovisual distraction is cheap, easy to use, non-invasive, and simple to implement in both public and private immunisation facilities; if proven effective, it may be utilized in regular nursing practice to provide atraumatic nursing care during immunisation. Therefore, given the significance of pain control in connection with immunisation, and the lack of data supporting nurse led cartoon therapy for preschoolers in Gurugram, Haryana, the researcher believed it was necessary to conduct the current study investigating the use of cartoon based audiovisual distraction in decreasing perceived pain related to immunisations in preschoolers.

Aim:

To assess the effectiveness of nurse-led cartoon therapy on the level of pain during immunisation among preschool children in selected immunisation centres, Gurugram, Haryana.

Objectives of the study:**General Objective:**

To determine the effectiveness of nurse-led cartoon therapy in reducing the level of pain experienced by preschool children during immunisation.

Specific Objectives:

1. To develop nurse-led cartoon therapy during injection administration among preschool children.

2. To assess the effectiveness of cartoon therapy among preschool children during immunisation between the experimental and control groups.

3. To find out the association between post-intervention pain levels among preschool children who received cartoon therapy and their selected demographic variables

METHODOLOGY:

The study adopted a quantitative research approach and a quasi-experimental post-test-only control group design. The study was conducted at SGT Hospital, Haryana, among preschool children aged 3–6 years. The total sample consisted of 60 preschool children, with 30 children in the experimental group and 30 children in the control group, who were selected using a non-probability purposive sampling technique. Data were collected using two sections: Section A, which included demographic variables, and Section B, which comprised the Wong-Baker FACES Pain Rating Scale and a self-structured Behavioural Response Checklist for assessing pain intensity and behavioural responses among the children. Prior to data collection, necessary administrative permission was obtained from the concerned authorities of SGT Hospital, and informed consent was obtained from the parents/guardians of the selected children. The eligible children were identified according to the predetermined inclusion and exclusion criteria and were assigned to the experimental and control groups. Baseline demographic information was collected, following which the planned intervention was administered to the experimental group, while the control group received the routine care provided at the hospital. After the intervention, post-test data were collected from both groups using the Wong-Baker FACES Pain Rating Scale and the self-structured Behavioural Response Checklist. The data were systematically coded, tabulated, and analysed using appropriate descriptive statistics such as frequency, percentage, mean, and standard deviation, and inferential statistics such as the independent *t*-test and chi-square test, as applicable, to determine the effectiveness of the intervention and compare the outcomes between the experimental and control groups.

Result:

Table 1: Frequency and Percentage Distribution of Demographic Variables of Preschool Children (N = 60)

S. No.	Demographic Variable	Categories	Control Group		Experimental Group	
			Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1	Age of	3 years	6	20.0	7	23.3

	Child					
		4 years	8	26.7	8	26.7
		5 years	10	33.3	9	30.0
		6 years	6	20.0	6	20.0
2	Gender	Male	17	56.7	17	56.7
		Female	13	43.3	13	43.3
3	Area of Residence	Rural	11	36.7	10	33.3
		Urban	19	63.3	20	66.7
4	Type of Family	Nuclear	21	70.0	22	73.3
		Joint	9	30.0	8	26.7
5	Religion	Hindu	24	80.0	25	83.3
		Muslim	3	10.0	3	10.0
		Sikh	2	6.7	2	6.7
		Christian	1	3.3	1	3.3
		Other	0	0	0	0
6	Educational Status of Mother	No Formal Education	1	3.3	1	3.3
		Primary	9	30.0	9	30.0
		Secondary	10	33.3	10	33.3
		Graduate	10	33.3	10	33.3
		Postgraduate	0	0	0	0.0
7	Educational Status of Father	No Formal Education	1	3.3	1	3.3
		Primary	4	13.3	4	13.3
		Secondary	13	43.3	13	43.3
		Graduate	12	40.0	12	40.0
		Postgraduate	0	0	0	0
8	Previous History of Venipuncture/Immunization	Yes	30	100	30	100

		No	0	0	0	0
9	Site of Immunisation	Left Arm	12	40.0	11	36.7
		Right Arm	9	30.0	8	26.7
		Left Thigh	5	16.7	5	16.7
		Right Thigh	4	13.3	4	13.3
10	Time of Procedure	Morning Session	25	83.3	25	83.3
		Afternoon Session	5	16.7	5	16.7

Table 1 presents the frequency and percentage distribution of preschool children according to selected demographic variables in the control group (n = 30) and experimental group (n = 30). Regarding age, the majority of children were 5 years old, comprising 10 (33.3%) in the control group and 9 (30.0%) in the experimental group, followed by 4-year-old children, with 8 (26.7%) in each group. The distribution of 3- and 6-year-old children was relatively similar between the groups. With regard to gender, males constituted the majority, with 17 (56.7%) children in each group, while females accounted for 13 (43.3%). Most children resided in urban areas, with 19 (63.3%) in the control group and 20 (66.7%) in the experimental group, and belonged to nuclear families, accounting for 21 (70.0%) and 22 (73.3%), respectively. The majority of children were Hindu, comprising 24 (80.0%) in the control group and 25 (83.3%) in the experimental group. Regarding parental education, most mothers had secondary or graduate-level education, while most fathers had secondary education followed by graduate education. All children (100%) in both groups had a previous history of venipuncture/immunisation. The left arm was the most commonly used immunisation site, accounting for 12 (40.0%) children in the control group and 11 (36.7%) in the experimental group, followed by the right arm. Most immunisation procedures were performed during the morning session, accounting for 25 (83.3%) children in each group. Overall, the demographic characteristics of the control and experimental groups were comparable.

Objective 2: Comparison of Post-Intervention Pain and Behavioural Responses Between Experimental and Control Groups

Table 2: Comparison of Post-Intervention Pain Scores Between Control and Experimental Groups

Group	N	Mean	SD	t-value	p-value
Control Group	30	3.67	0.48	9.26	<0.001
Experimental Group	30	2.33	0.66		
Total	60				

This table shows comparison of post-intervention pain scores among preschool children in the control and experimental groups. The mean pain score in the control group was 3.67 ± 0.48 , whereas the mean pain score in the experimental group was 2.33 ± 0.66 . The calculated t-value was 9.26 with a p-value < 0.001 , indicating a highly statistically significant difference between the two groups.

Figure 1 : Comparison of Pain Levels Between Control and Experimental Groups

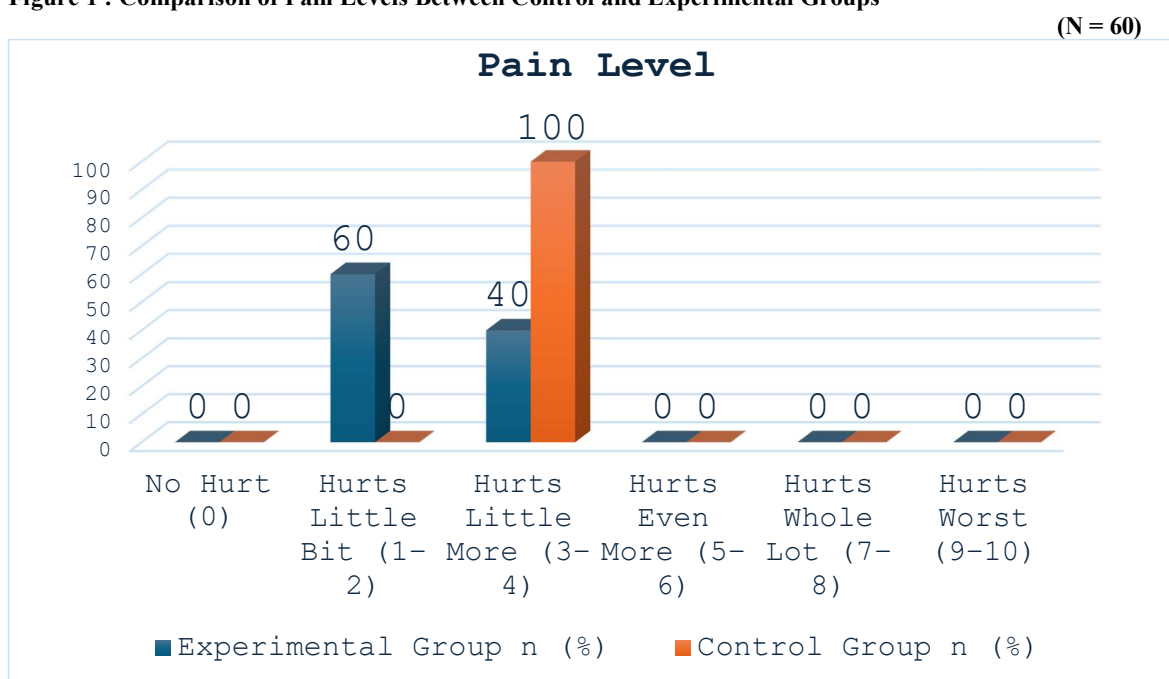


Figure 1 depicts the distribution of post-test pain levels among preschool children in the experimental and control groups as measured by the Wong-Baker FACES Pain Rating Scale. In the experimental group, the majority of children, 18 (60.0%), experienced pain in the "Hurts Little Bit" category, while 12 (40.0%) children reported pain in the "Hurts Little More" category. None of the children experienced pain in the categories of No Hurt, Hurts Even More, Hurts Whole Lot, or Hurts Worst. In contrast, all 30 (100.0%) children in the control group reported pain in the "Hurts Little More" category. No child in the control group reported pain in any of the other categories.

Table 4: Comparison of Post-Intervention Behavioural Response Scores Between Control and Experimental Groups

Group	N	Mean	SD	t-value	p-value
Control Group	30	2.60	0.50	7.21	<0.001
Experimental Group	30	1.63	0.55		
Total	60				

Table 4 depicts the comparison of post-intervention behavioral response scores among preschool children in the control and experimental groups. The mean behavioral response score in the control group was 2.60 ± 0.50 , whereas the mean behavioral response score in the experimental group was 1.63 ± 0.55 . The calculated t-value was 7.21, which was found to be statistically significant at $p < 0.001$. This indicates a highly significant difference in behavioral response scores between the two groups.

Fig. 2: Bar graph shows distribution of respondents according to behavioural distress level

(N = 60)

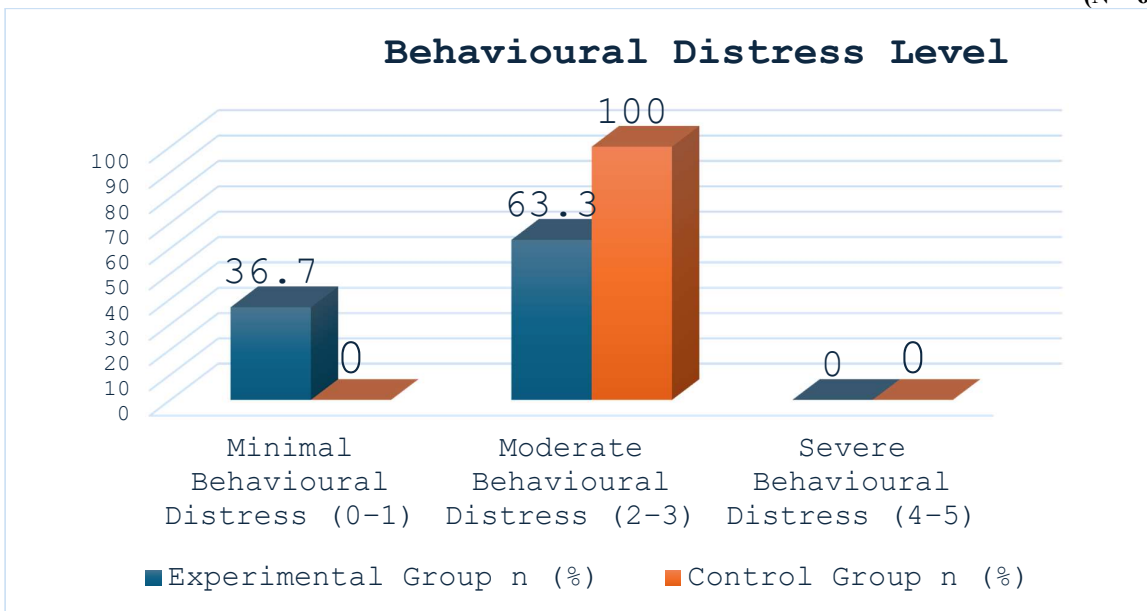


Figure 2 presents the distribution of post-test behavioural distress levels among preschool children in the experimental and control groups based on the Self-Structured Behavioural Response Checklist. In the experimental group, 11 (36.7%) children exhibited minimal behavioural distress, while 19 (63.3%) children demonstrated moderate behavioural distress during immunisation. None of the children experienced severe behavioural distress. In the control group, all 30 (100.0%) children exhibited moderate behavioural distress, whereas no child demonstrated minimal or severe behavioural distress.

Objective 3: Association Between Post-Intervention Pain Levels and Selected Demographic Variables

Table 5: Association Between Post-Test Pain Levels and Selected Demographic Variables Among Preschool Children in the Experimental Group

S. No.	Demographic Variable	Categories	Hurts Little Bit n (%)	Hurts Little More n (%)	χ^2 Value	df	p-value	Significance
1	Age	3 years	4	3	2.45	3	0.484	NS
		4 years	5	3				
		5 years	6	3				
		6 years	3	3				
2	Gender	Male	10	7	0.18	1	0.671	NS
		Female	8	5				
3	Area of Residence	Rural	6	4	0.62	1	0.431	NS
		Urban	12	8				
4	Type of Family	Nuclear	13	9	0.01	1	0.921	NS
		Joint	5	3				
5	Religion	Hindu	15	10	2.11	3	0.550	NS
		Muslim	2	1				
		Sikh	1	1				
		Christian	0	1				

6	Educational Status of Mother	No Formal Education	1	0	2.89	4	0.576	NS
		Primary	5	4				
		Secondary	6	4				
		Graduate	6	4				
7	Educational Status of Father	No Formal Education	1	0	1.95	4	0.745	NS
		Primary	2	2				
		Secondary	8	5				
		Graduate	7	5				
8	Previous History of Immunization	Yes	18	12	4.52	1	0.033	S*
		No	0	0				
9	Site of Immunization	Left Arm	7	4	1.27	3	0.736	NS
		Right Arm	5	3				
		Left Thigh	3	2				
		Right Thigh	3	1				
10	Time of Procedure	Morning Session	17	8	3.95	1	0.047	S*
		Afternoon Session	1	4				

Table 6 showed that there was no statistically significant association between post-test pain levels and age, gender, area of residence, type of family, religion, educational status of mothers or fathers, or site of immunisation among preschool children in the experimental group ($p > 0.05$). However, a statistically significant association was found between pain level and previous history of immunisation ($\chi^2 = 4.52$, $df = 1$, $p = 0.033$) and time of the procedure ($\chi^2 = 3.95$, $df = 1$, $p = 0.047$). These findings indicated that previous immunisation experience and the timing of the procedure were significantly associated with the children's post-test pain levels.

DISCUSSION

In Context of Objective 2: Comparison of Post-Intervention Pain and Behavioural Responses Between Experimental and Control Groups

The findings of the present study demonstrated a statistically highly significant difference in post-intervention pain levels between the experimental and control groups. Children who received nurse-led cartoon therapy reported lower pain scores compared to those who received routine care. The majority of children in the experimental group experienced minimal pain, whereas children in the control group reported comparatively higher levels of pain following immunisation. Similarly, behavioral responses observed during the procedure were more favorable among children exposed to cartoon therapy, indicating reduced distress and better cooperation.

These findings suggest that cartoon therapy is an effective non-pharmacological intervention for reducing immunisation-related pain and behavioural discomfort among preschool children. The audiovisual distraction provided by cartoons may divert the child's attention from the painful stimulus, thereby decreasing pain perception and anxiety associated with the procedure.

The findings are consistent with the study conducted by Reddy, Thomas, and Mathew (2023), who reported significantly lower pain scores among preschool children who viewed cartoon videos during immunisation compared to those receiving standard care. Similar results were observed by Meena, Sharma, and Yadav (2022), who found that audiovisual cartoon distraction effectively reduced vaccination-related pain in children. Likewise, Gupta, Gupta, and Kaur (2019) reported that children exposed to cartoon video distraction experienced lower pain scores than those in the control group.

The consistency between the present study and previous research supports the effectiveness of cartoon-based distraction techniques in minimising procedural pain and improving children's behavioural responses during immunisation.

In Context of Objective 3: Association Between Post-Intervention Pain Levels and Selected Demographic Variables

The present study examined the association between post-intervention pain levels and selected demographic variables among preschool children in the experimental group. The findings revealed a statistically significant association between post-test pain levels and previous history of immunisation. Children who had prior immunisation experiences appeared to respond more positively to cartoon therapy, possibly due to reduced fear and greater familiarity with the

procedure. A significant association was also observed between the timing of the procedure and post-test pain levels, indicating that children immunized during morning hours experienced comparatively lower pain than those immunized later in the day.

On the other hand, variables such as age, gender, and place of residence did not show any statistically significant association with post-intervention pain levels. This indicates that the effectiveness of cartoon therapy was largely independent of these demographic characteristics.

The findings are supported by Singh, Verma, and Kaur (2024), who reported that demographic variables such as age and gender did not significantly influence the effectiveness of cartoon therapy in reducing pain among preschool children. Similarly, Sridhar, Kumar, and Ramesh (2022) found no significant relationship between basic demographic characteristics and the pain-relieving effects of cartoon distraction during routine immunisation procedures. These findings suggest that cartoon therapy can be beneficial for a wide range of preschool children regardless of their demographic background. However, factors such as previous immunisation experience and timing of the procedure may influence the extent of pain reduction achieved through distraction therapy.

Overall, the findings of the present study emphasize that nurse-led cartoon therapy is an effective and practical intervention for reducing immunisation-related pain and improving behavioural responses among preschool children, while certain situational factors may further enhance its effectiveness

SUMMARY

The purpose of this study was to assess the effectiveness of Nurse-Led Cartoon Therapy on the level of pain during immunisation among preschool children in selected immunisation centres of Gurugram, Haryana.

A quantitative research approach was used to conduct the present study. A post-test only control group quasi-experimental research design was adopted for this study. The sample of the present study consisted of 60 preschool children undergoing immunisation in selected immunisation centres of Gurugram, Haryana. The sample included 30 preschool children in the experimental group and 30 preschool children in the control group. Data were collected using demographic variables proforma, Wong-Baker FACES Pain Rating Scale and Self-Structured Behavioural Response Checklist.

The collected data were analysed using descriptive and inferential statistics. Frequency, percentage, mean, standard deviation, independent t-test and chi-square test were used for analysis. The findings were presented through tables and graphical representations.

Major Findings

The study found that most preschool children in both groups were 5 years old, male, from urban areas and nuclear families, with the majority being Hindu; all had a previous history of immunisation, which was mostly administered in the left arm during the morning session. The mean post-test pain score was significantly lower in the experimental group (2.33 ± 0.66) than in the control group (3.67 ± 0.48), with a highly significant difference ($t = 9.26, p < 0.001$). In the experimental group, 60% of children experienced “Hurts Little Bit” pain and 40% experienced “Hurts Little More,” whereas all children (100%) in the control group experienced “Hurts Little More” pain. Similarly, the mean behavioural response score was significantly lower in the experimental group (1.63 ± 0.55) compared with the control group (2.60 ± 0.50), with a highly significant difference ($t = 7.21, p < 0.001$). Moderate behavioural distress was observed in 63.3% of the experimental group and 100% of the control group. A significant association was found between post-test pain level and time of procedure in the experimental group, while no significant association was observed with other selected demographic variables or among children in the control group.

CONCLUSION

In the present study, it was found that Nurse-Led Cartoon Therapy was effective in reducing pain and behavioural distress among preschool children during immunisation. Children who received cartoon therapy had lower pain scores and better behavioural responses compared to children who received routine care. Therefore, Nurse-Led Cartoon Therapy can be used as an effective non-pharmacological intervention during immunisation procedures.

RECOMMENDATIONS

- ❖ Similar studies may be conducted on a larger sample size.
- ❖ Similar studies may be conducted in different hospitals and immunisation centres.
- ❖ Comparative studies may be conducted using other distraction techniques such as music therapy, storytelling and play therapy.
- ❖ Similar studies may be conducted among different age groups of children.
- ❖ The study may be replicated in different geographical areas.

LIMITATIONS

- ❖ The study included only 60 preschool children.

- ❖ The study was conducted only in selected immunisation centres of Gurugram, Haryana.
- ❖ Non-probability purposive sampling technique was used for selecting the samples.
- ❖ The study included only preschool children aged 3–6 years.
- ❖ The duration of data collection was limited.

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