



“A COMPARATIVE STUDY TO EVALUATE THE EFFECTIVENESS OF KALEIDOSCOPE VERSUS DISTRACTION CARDS ON PAIN LEVEL AMONG CHILDREN UNDERGOING INVASIVE PROCEDURES IN SELECTED HOSPITALS.”

Komal Baban Vibhute,¹ Ms.Dipratna .P.Atram,²

¹MSc Nursing student, ²Associate Professor and HOD

¹Department of child Health Nursing, ²Department of child Health Nursing.

¹College of Nursing, Government Medical College, Nagpur, India,

²College of Nursing, Government Medical College, Nagpur, India.

Corresponding Author : Komal Baban Vibhute

ABSTRACT

Introduction-Painful medical procedures can be distressing and traumatic for individuals especially children. To alleviate procedural pain and anxiety, healthcare professionals have employed various distraction techniques. Two innovative tools that have shown promise in reducing pain and anxiety are kaleidoscopes and distraction cards. This study Evaluate the Effectiveness of Kaleidoscope Versus Distraction Cards on Pain Level Among Children Undergoing Invasive Procedures in Selected Hospitals. **Objectives**-1. To assess the pain level among children undergoing invasive procedures at baseline. 2. To evaluate the effectiveness of kaleidoscope on pain level among children undergoing invasive procedures in selected hospitals. 3. To evaluate the effectiveness of distraction cards on pain level among children undergoing invasive procedures in selected hospitals 4. To compare the pain level in kaleidoscope group with distraction card group. 5. To find association of study findings with selected demographic Variables. **Methodology**-Quantitative Research Approach. Two group comparative Study. Study setting was selected hospitals. Study population preschooler 3-6 year of selected hospitals. Sample was given preschooler 3-6 year hospitalized children selected in hospitals. Sample size 80 Sampling technique was simple randomize sampling technique used. A FLACC Pain assessment scale was used to assess pain level during the interventions. Data were analyzed using descriptive and inferential statistics to determine the reducing pain level between groups. **Result**-Both Techniques reducing pain level during invasive procedure with statistically significant decreasing the pain level scores. However Kaleidoscope technique was greater impact, high-lighting its effect in reducing pain level .The discussion emphasize the kaleidoscope was effective technique for reducing pain level during invasive procedures **Conclusion**-Kaleidoscope was more effective Distraction technique than distraction card for reducing level of pain during invasive procedures in hospitals. In order to reduce pain in the future, kaleidoscope distraction techniques should be used, and other new distraction techniques like this should also be explored. **Recommendations**-The routine use of Kaleidoscope distraction techniques during invasive procedures in pediatric settings to reduce pain in

children.1.Nursing staff should receive regular training on age-appropriate distraction methods and their effective implementation. 2.Hospitals should include distraction techniques in pediatric care guidelines and ensure the availability of simple resources.3.Further research is recommended with larger samples and different age groups to strengthen evidence and explore the effectiveness of various distraction methods.

Keywords-kaleidoscope, distraction card, pain level, children, invasive procedures.

INTRODUCTION-

Painful medical procedures can be distressing and traumatic for individuals, especially children. To alleviate procedural pain and anxiety, healthcare professionals have employed various distraction techniques. Two innovative tools that have shown promise in reducing pain and anxiety are kaleidoscopes and distraction cards.¹ Kaleidoscopes are optical instruments that create colourful, symmetrical patterns using mirrors and glass fragments. The mesmerizing visuals can captivate an individual's attention, diverting focus away from the painful procedure. Distraction cards are specially designed cards featuring engaging images, puzzles, or games. These cards can be used to distract individuals during painful procedures, reducing anxiety and discomfort. The use of kaleidoscopes and distraction cards is grounded in the concept of distraction therapy. By diverting an individual's attention away from the painful procedure, these tools can help reduce anxiety, pain perception, and distress.² Kaleidoscopes and distraction cards during painful procedures can offer several benefits, including:1. Reduced pain and anxiety: By distracting individuals from the procedure, these tools can help alleviate pain and anxiety (Kuttner, 2010, p. 125).2. Improved patient experience: The use of kaleidoscopes and distraction cards can create a more positive and calming experience for individuals undergoing painful procedures (Cohen, 2008, p. 158).3. Enhanced coping mechanisms: These tools can help individuals develop effective coping mechanisms for managing pain and anxiety during medical procedures.³

During Hospitalization, Children May Undergo a Wide Range of Interventions, Many of Which Can be Stressful, Painful and Traumatic. Despite Advances in both Pharmacological and non-pharmacological Methods of Preventing and Treating Pain, Many Children Still Endure Unacceptable Level of Distress and Pain During their Hospitalization. The Process Made by a Syringe in Children are Most Common Source of Pain and Venipuncture has been Evaluated as one of the Most Painful Interventions Commonly Applied to Children. Empirical Evidence Show that Unrelieved Pain in Children has Only Harmful Consequences, With no Benefits.

Health Care Professionals in Hospital Setting have a Responsibility to Reduce Pain and Anxiety as much as Possible. Optimal Pain Management is the Right of Patient and Responsibility of Health Professionals. Thus to Reduce the Emotional and Physical Effects of Painful Interventions and to Prevent long term Results of Pain in Children, the Nurses should be able to Manage the Painful Procedures. Among the Pharmacological and non-pharmacological Interventions (Independent or Complementary), Non-pharmacological Method have been Considered to be Favorable Strategy for Pain Management and Research Focusing on Nurses Use of Non –Pharmacological Method for Relief of Children's Pain has Increased in Recent Years. One of the Effective Non –Pharmacological Method is Distraction.⁴

Objectives

1. To assess the pain level among children undergoing invasive procedures at baseline.
2. To evaluate the effectiveness of kaleidoscope on pain level among children undergoing invasive procedures in selected hospitals.
3. To evaluate the effectiveness of distraction cards on pain level among children undergoing invasive procedures in selected hospitals
4. To compare the pain level in kaleidoscope group with distraction card group.
5. To find association of study findings with selected demographic variables.

Research hypothesis-

H₀ - There is no significant difference in between kaleidoscope and distraction card for successful reducing pain Level after intervention among hospitalized children.

H₁ - there is significant difference in between kaleidoscope and distraction card for successful reducing pain level before and after intervention among hospitalized children.

Conceptual framework-

Theoretical Basis

The conceptual framework of the present study is based on Gate Control Theory of Pain proposed by Melzack and Wall (1965). According to this theory, pain perception is not solely the result of tissue damage but is influenced by a balance between nociceptive stimuli and non-painful sensory inputs. The theory proposes a neurological “gate” mechanism in the spinal cord that can either allow or inhibit pain impulses from reaching the brain.¹⁴

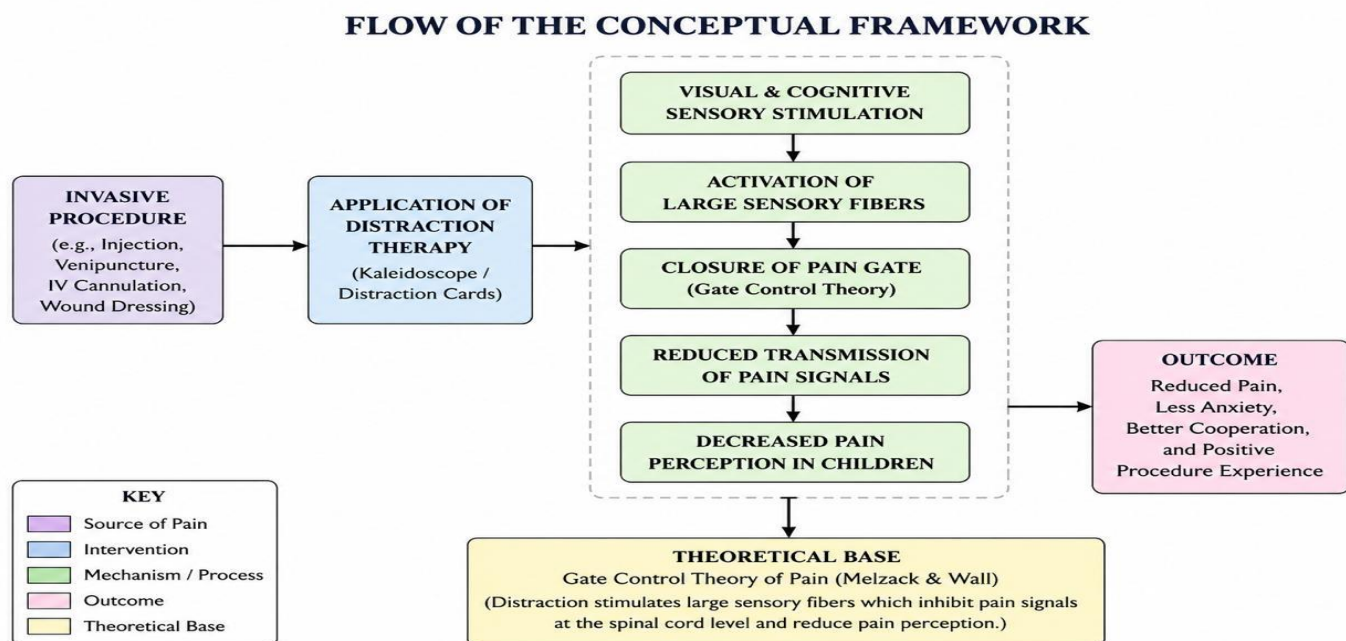


Fig no -1.2: Conceptual framework

RESEARCH METHODOLOGY

Research Approach

The present study adopted a quantitative research approach.

Research Design

The study used a post-test two-group comparative research design.

Target Population

The target population consisted of preschool children who fulfilled the inclusion criteria.

Accessible Population

The accessible population consisted of preschool children who were available at the selected hospitals during the period of data collection.

Setting

The study was conducted in selected hospitals.

Sampling Technique

A simple random sampling technique was used to select the preschool children for the study.

Sample Size

The total sample size was 80 preschool children, comprising 40 children in the kaleidoscope group and 40 children in the distraction card group.

SAMPLE SIZE CALCULATION

* **Formula used:** Sample size is calculated based on the following parameters using Epi Info software.

* Formula:

$$N = 2 (Z\alpha + Z\beta)^2 S^2 / d^2$$

* $Z\alpha = 1.96$ for $\alpha = 0.05$.

* $Z\beta = 0.84$ for $\beta = 0.2$, i.e., 80% power.

* $S^2 = (S_1^2 + S_2^2) / 2$

* Total sample size = 80

* Tool: Pain assessment scale and questionnaire on demographic data.

Sampling Criteria

The participants were selected according to the specified inclusion and exclusion criteria.

Research Variables

The independent variables were the kaleidoscope and distraction cards, whereas the dependent variable was the level of pain among preschool children undergoing invasive procedures.

Data Collection Tool

Data were collected using a tool consisting of Part I: Demographic Questionnaire and Part II: FLACC Pain Assessment Scale.

Validity

The content validity of the research tool was established by obtaining the opinions of 18 experts.

Reliability

The reliability of the tool was established using the parallel-form method, and the Pearson's correlation coefficient was found to be $r = 0.8913$.

Pilot Study

A pilot study was conducted on 12 preschool children undergoing invasive procedures to assess the feasibility and practicality of the study procedure. The kaleidoscope and distraction card interventions were administered, and pain levels were assessed using the selected FLACC pain assessment tool. The study confirmed that the tool and procedure

were feasible and suitable for the main study.

Main Study

The main data collection was carried out from 10/11/2025 to 21/11/2025.

Statistical Analysis

The collected data were analyses using descriptive and inferential statistics.

IV-RESULT AND DISCUSSION

This section deals with percentage wise distribution of Children with regards to their demographic characteristics. A convenient sample of 80 subjects was drawn from the study population, who were from selected hospitals. The data obtained to describe the sample characteristics including age, gender, educational status of parents, type of family, occupation of parents, residence and previous experience of pain respectively.

Table 4.1: Percentage wise distribution of Children according to their demographic characteristics.

n=80

Demographic Variables	Kaleidoscope(n=40)	Distraction Card (n=40)
Age(yrs)		
3-4 yrs	6(15%)	10(25%)
4.1-5 yrs	9(22.5%)	15(37.5%)
5.1-6 yrs	25(62.5%)	15(37.5%)
Gender of the child		
Male	15(37.5%)	16(40%)
Female	24(60%)	24(60%)
Others	1(2.5%)	0(0%)
Educational Status of Parents		
Illiterate	2(5%)	1(2.5%)
Primary Education	9(22.5%)	9(22.5%)
Secondary Education	19(47.5%)	16(40%)
Graduation	9(22.5%)	13(32.5%)
Postgraduation	1(2.5%)	1(2.5%)
Type of family		
Joint	20(50%)	22(55%)
Extended	1(2.5%)	3(7.5%)
Nuclear	19(47.5%)	15(37.5%)
Occupation of parents		
Housemaker	10(25%)	14(35%)
Private Job	19(47.5%)	19(47.5%)
Govt Job	4(10%)	0(0%)
Daily Wages	7(17.5%)	7(17.5%)
Area of residence		
Urban	9(22.5%)	18(45%)
Rural	24(60%)	15(37.5%)
Slum Area	7(17.5%)	7(17.5%)
Previous experience of pain		
1 st experience	19(47.5%)	13(32.5%)
2 nd experience	14(35%)	16(40%)

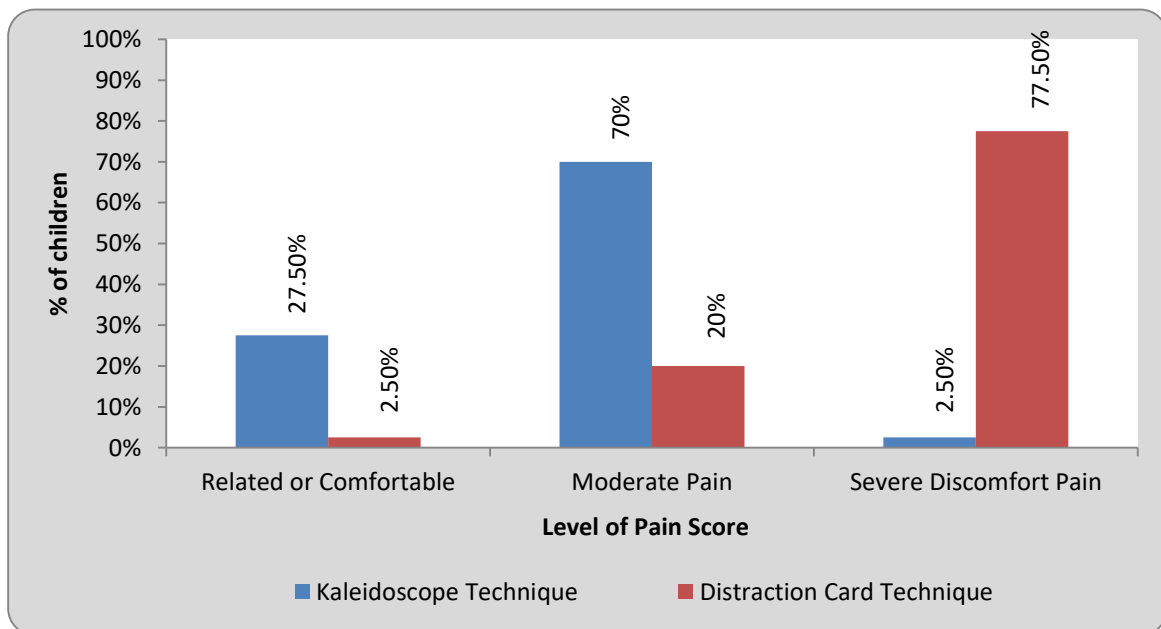
3 rd experience	4(10%)	3(7.5%)
Multiple Experience	3(7.5%)	8(20%)

SECTION B:-

Assessment of level of the pain in kaleidoscope versus distraction card among children undergoing invasive procedures from selected hospitals

Table 4.2 : Assessment with level of Pain score (n=80)

Level of Pain Score	Score Range	Level of Pain Score	
		Kaleidoscope Technique	Distraction Card Technique
Related or Comfortable	0-3	11(27.5%)	1(2.5%)
Moderate Pain	4-6	28(70%)	8(20%)
Severe Discomfort Pain	7-10	1(2.5%)	31(77.5%)
Minimum score		1	3
Maximum score		8	10
Mean Pain score		4±1.26	7±1.33
Mean % Pain score		40±12.6	70±13.3



Graph 4.8: Assessment with level of Pain score.

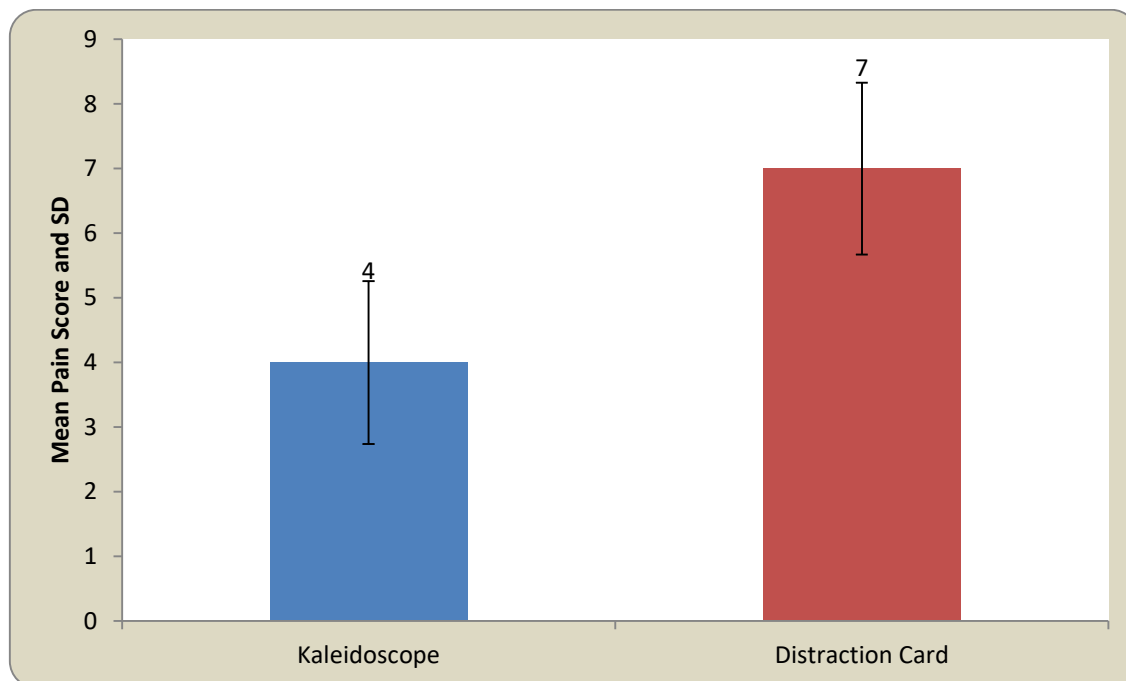
The mean pain score was lower in the Kaleidoscope group (4 ± 1.26) compared to the Distraction Card group (7 ± 1.33).

SECTION-C

Evaluation of the effectiveness of kaleidoscope versus distraction card technique on pain level among children undergoing invasive procedures in selected hospitals

Table 4.3 : Significance of difference between Pain Score in Kaleidoscope and Distraction Card Technique of Children.(n=80)

Technique	Mean	SD	Mean Difference	t-value	p-value
Kaleidoscope	4	1.26	3±0.29	10.31	0.0001
Distraction Card	7	1.33			S,p<0.05



Graph 4.9: Significance of difference between Pain Score in Kaleidoscope and Distraction Card Technique of Children.

The calculated t-value (10.31) was higher than the tabulated t-value (1.98) at the 5% level of significance ($p = 0.0001$), showing a statistically significant difference between the two groups. Therefore, H_1 was accepted. The findings indicate that the Kaleidoscope technique was more effective than the Distraction Card technique.

SECTION D

Association of the level of the pain score among children in kaleidoscope versus distraction card undergoing invasive procedure in selected hospitals in relation to their demographic variables.

Kaleidoscope technique:

DEMOGRAPHIC VARIABLES	CHI-SQUARE	P-VALUE	SIGNIFICANCE
Age in year	19.21	$P < 0.05$	Associated
Gender	1.33	$P > 0.05$	Not associated
Parents education	26.23	$P < 0.05$	Associated
Types of family	3.20	$P > 0.05$	Not associated

Parents occupation	9.31	P>0.05	Not associated
Area of residency	5.26	P>0.05	Not associated
Previous experience of pain	4.97	P>0.05	Not associated

Distraction Card technique:

DEMOGRAPHIC VARIABLES	CHI-SQUARE	P-VALUE	SIGNIFICANCE
Age in year	10.32	P<0.05	Associated
Gender	1.54	P>0.05	Not associated
Parents education	8.56	P>0.05	Not Associated
Types of family	5.05	P>0.05	Not associated
Parents occupation	3.56	P>0.05	Not associated
Area of residency	14.19	P<0.05	Associated
Previous experience of pain	5.56	P>0.05	Not associated

SUMMARY-

This study compared the effectiveness of kaleidoscope and distraction cards in reducing pain among 80 preschool children undergoing invasive procedures. Pain was assessed using the FLACC Pain Scale. The findings showed that both techniques reduced pain, but kaleidoscope was more effective than distraction cards. The study concluded that distraction techniques are safe, simple, and effective non-pharmacological methods for pain management in children.

IV-DISCUSSION-

The present study revealed that the majority of children were preschoolers with comparable demographic characteristics in both the kaleidoscope and distraction card groups. This similarity indicates that the two groups were reasonably comparable before the intervention, which supports a fair comparison of pain levels. Similar demographic distributions among children undergoing painful procedures were also reported by Neila Canbulat et al. (2014) and Rohini P. Dani (2024). Therefore, the demographic characteristics in the present study are consistent with findings from previous studies.

The present study showed a reduction in pain level in both groups. The mean pain score was 4.0 ± 1.26 in the kaleidoscope group and 7.0 ± 1.33 in the distraction card group, indicating greater pain reduction among children who received the kaleidoscope intervention. These findings are supported by Kumari & Upendra Babu (2018) and Inal & Kelleci (2012), who reported that visual distraction techniques were effective in reducing procedural pain among children. Thus, the findings of the present study support the effectiveness of visual distraction as a non-pharmacological method for reducing procedural pain.

The present study found that the kaleidoscope was significantly more effective than distraction cards in reducing pain levels among preschool children ($p < 0.05$). The mean pain score was lower in the kaleidoscope group, demonstrating better pain control during invasive procedures. This finding is comparable with previous research showing that distraction techniques can effectively reduce procedural pain in children. Karamanoğlu Mehmetbey University, Turkey (2024) reported that distraction cards were also effective, with a mean pain score of 2.41 ± 2.49 ($p = 0.005$). The findings suggest that both visual distraction methods can be useful, although the present study demonstrated greater effectiveness with the kaleidoscope.

The present study found a statistically significant association between pain level and selected demographic variables ($p < 0.05$), particularly age, parents' educational status, and area of residence. This indicates that certain demographic characteristics may influence children's perception or expression of pain during invasive procedures. However, distraction techniques remain useful for managing procedural pain across different groups of children. Similar findings

from previous studies suggest that distraction techniques are effective in reducing procedural pain despite variations in children's demographic characteristics.

CONCLUSION-

After the detailed analysis, this study leads to the following conclusion:

This table shows the comparison of pain score among children of Kaleidoscope versus Distraction Card technique from selected hospitals. Mean, standard deviation and mean difference values are compared and student's unpaired 't' test is applied at 5% level of significance. The tabulated value for $n=40+40-2$ i.e. 78 degrees of freedom was 1.98. The calculated 't' value i.e. 10.31 are much higher than the tabulated value at 5% level of significance for overall Pain score of children from selected hospitals which is statistically acceptable level of significance. Hence it is statistically interpreted that Kaleidoscope versus Distraction Card Technique on pain level among children undergoing invasive procedures in selected hospitals was effective. Thus, the H_1 is accepted.

The study concludes that the kaleidoscope is significantly more effective than distraction cards in reducing pain among children undergoing invasive procedures.

RECOMMENDATIONS-

The study recommends

1. The routine use of Kaleidoscope distraction techniques during invasive procedures in pediatric settings to reduce pain in children.
2. Nursing staff should receive regular training on age-appropriate distraction methods and their effective implementation.
3. Hospitals should include distraction techniques in pediatric care guidelines and ensure the availability of simple resources.
4. Further research is recommended with larger samples and different age groups to strengthen evidence and explore the effectiveness of various distraction methods.

REFERENCES-

1. Cohen, L. L. (2008). Pediatric pain management: A practical guide. Humana Press. (p. 156)
2. Kuttner, L. (2010). A child in pain: What health professionals can do to help. University of Washington Press. (p. 123)
3. Wohlheiter, K. E., & Dahlquist, L. M. (2000). Using kaleidoscopes to distract children during medical procedures. *Journal of Developmental and Behavioral Pediatrics*, 21(2), 123-128.
4. Nejla canbulat march 2024 Asian nursing research ,volume-8 page no 23-24
5. Mrs,rohinip.dani. 2024 African journal of biological science vol-6pg n1639-1647 <https://doi.org/10.33472/AFJBS.6.6.2024.1639-1647>
6. Himali Raj Prajapati. A Study to Assess the Effectiveness of Kaleidoscope in Reducing Physical Stress during Venipuncture Procedure among Hospitalized Pre-School Children at Selected Hospital of Ahmadabad City, Gujarat State. *Int. J. Nur. Edu. and Research*. 2018; 6(1): 44-46. doi: 10.5958/2454-2660.2018.00011.X.
7. Aditya PVA, Prasad MG, Nagaradhakrishna A, Raju NS, Babu DN. Comparison of effectiveness of three distraction techniques to allay dental anxiety during inferior alveolar nerve block in children: A randomized controlled clinical trial. *Heliyon*. 2021 Sep 29;7(9):e08092. doi: 10.1016/j.heliyon.2021.e08092. PMID: 34632153; PMCID: PMC8488815.
8. Pediatric Nursing Department, School of Health, Karamanoglu Mehmetbey University, Karaman, Turkey. ncanbulat@gmail.com Asian Nurs Res. 2014 Mar;8(1):23-28.

9. Gülsoy H, Toru F, Öntürk Akyüz H, Üner FÖ. The Impact of Kaleidoscope and Distraction Cards on Pain Level During Blood Drawing in Children. MRR. 2024;7(3):120-32
10. IOSR Journal of Nursing and Health Science (IOSR-JNHS)www.iosrjournals.org-ISSN: 2320-1959,p-ISSN: 2320-1941) Volume 7, Issue 2 Ver. VII (Mar-Apr 2018), PP 64-78Effect of Distraction Techniques on Minimizing Pain Associated With Burn Dressing Changes among Preschool Children Heba Abd Allah Abd Elnabi, Amal Mohamed El-Dakhakhny
11. Arıkan A, Esenay FI. The effect of using a kaleidoscope on pain levels during invasive procedures in children aged 4 to 12 years: A systematic review. J Pediatr Nurs. 2025;85:511–516.
12. Lwanga SK, Lemeshow S. Sample size determination in health studies: A practical manual. Geneva: World Health Organization; 1991
13. Oxford English Dictionary, 2nd edition, Oxford University Press, 1989. Page Number: Vol. 2, p. 734
14. Kang M, Jung S, Jang H. Statistical notes for clinical researchers: sample size calculation 1. Comparison of two independent sample means. Restor Dent Endod. 2016;41(2):74-78. doi:10.5395/rde.2016.41.2.74.
15. Kunjumon B, Upendrababu U. Effect of kaleidoscope distraction on pain and physiological parameters during intravenous cannulation among preschool children. Indian J Child Health. 2018;5(6):401–405
16. Pediatric Nursing Department, School of Health, Karamanoglu Mehmetbey University, Karaman, Turkey. ncanbulat@gmail.com Asian Nurs Res. 2014 Mar;8(1):23-28.