



## Effectiveness of Distraction Techniques (Watching Animated Cartoons) in Reducing Pain During Infusion Insertion in Children at Multazam Hospital

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### ABSTRACT

Infusion insertion is an invasive procedure that involves the insertion of the device into the body and is often performed on children during hospital treatment. This action can cause pain, worry, and less adaptive behavioral reactions in children. Therefore, non-pharmacological pain management efforts are needed that are easy to implement, one of which is through distraction techniques by watching animated cartoons. The problem in this study is the high level of pain experienced by children during IV installation. This study aims to determine the effect of distraction techniques of watching animated cartoons on the reduction of children's pain levels during IV installation. This study uses a quantitative method with a quasi-experimental design of a nonequivalent control group. The subjects of the study were preschoolers who underwent infusion and were divided into two groups, namely the intervention group and the control group. Pain level measurements were performed before and after the intervention using the Wong-Baker Faces Pain Rating Scale.

The results of the univariate analysis showed that before the intervention, most of the children in both groups experienced moderate to severe pain. After the intervention, the group given the distraction of watching animated cartoons experienced a decrease in pain levels, characterized by increased mild pain and no severe pain found. Meanwhile, the control group still showed moderate to severe pain. The results of the Paired Sample t-Test showed a significant reduction in pain in the intervention group p. value ( $0.000 < 0.05$ ), while in the control group there was no significant difference in p. value ( $0.336 > 0.05$ ). The Independent Sample t-Test also showed a significant difference in pain reduction between the two groups of p. value ( $0.000 < 0.05$ ).

Conclusions: The distraction technique of watching animated cartoons has been shown to be effective in reducing children's pain during IV insertion and is recommended as a nonpharmacological intervention in pediatric care.

### INTRODUCTION

Hospitalization is a process of a reason, both planning and emergency that requires the child to stay in the hospital to undergo therapy and treatment until he returns home, during this process the child can experience various traumatic events and an unfamiliar environment Children are very susceptible to experiencing health complaints such as heat, cough, cold, and diarrhea, especially in children under 5 years old. In general, about 3 out of 10 children in Indonesia have experienced health complaints in the past month. The percentage of children living in urban areas reached 34.00% and experienced higher health complaints compared to children living in rural areas which reached 30.47% (Maternal and Child Health Profile, 2020).

According to the WHO, hospitalization can be a scary experience for a child, as the stressors faced can create a sense of insecurity. The hospitalization process in children can cause anxiety and stress in all age ranges. This anxiety is influenced by various factors, including interactions with health workers (such as nurses, doctors, and other medical personnel), unfamiliar environments, and the presence of family waiting during treatment

(Nursalam, 2020). Based on data from the World Health Organization in Germany, about 3 to 7% of toddlers and 5 to 10% of preschoolers are hospitalized. The prevalence of childhood anxiety during hospitalization is around 10% experiencing mild anxiety and it continues, and about 2% experiencing severe anxiety (Saidah, 2023).

The rate of child illness in Indonesia based on the National Economic Survey (SUSENAS) is 30.82% of preschool-age children (4-6 years) of the total Indonesian population and around 35 out of 100 children experience anxiety while undergoing treatment in hospitals (Aprillia, 2023). Based on the distribution data of Integrated Disease Surveillance (STP) of hospitals throughout Gorontalo Province, data was obtained on the number of children undergoing hospitalization in hospitals according to the age group of 1-4 years as many as 662 children. In the age group of 5-9 years as many as 238 children. In the age group of 10-14 years as many as 262 children. In the age group of 15-19 years as many as 394 children. (Gorontalo Provincial Health Office, 2014).

The reaction to the separation shown by preschoolers is to refuse to eat, ask questions often, cry even if it is slow, and be uncooperative with health workers. The number of preschoolers in the world's three most populous countries reaches about 148 million, and each year, about 958,000 of them receive treatment in health facilities. A UNICEF report (2022) revealed that 75% of the 57 million children who undergo treatment experience psychological trauma, including fear and anxiety during the process.

One of the procedures obtained by children who are hospitalized or hospitalized is IV insertion and blood collection (Sartika, 2020). The purpose of installing the infusion itself is to overcome the lack of electrolyte fluid, blood transfusions, administration of drugs, or nutrients needed by the patient through the intravenous route (Kusuma & Mulis, 2018). The impact of blood collection and infusion installation will cause pain in the area of the infusion needle or needle insertion at the time of blood collection (Sartika, 2020).

Pain is the sensation of discomfort that is manifested as a sufferer resulting from real perceptions, threats, and fantasies of wounds. Pain occurs due to unpleasant sensory experiences, the main element that must be present to be referred to as pain. Without it it cannot be categorized as pain, although otherwise everything that is unpleasant cannot be called pain. Pain management or actions to overcome pain that are usually done by room nurses in children are diversion exercise techniques, including watching television, talking to other people and listening to music, while relaxation techniques are by encouraging children to breathe slowly. Relax the muscles of the hands, legs, abdomen and back, and repeat the same while continuing to concentrate so that the patient feels comfortable, calm and relaxed (A. Pulungan et al., 2017).

The impact of blood collection and infusion installation will cause pain in the area where the infusion needle is inserted or the needle at the time of blood collection. Efforts to minimize the impact of pain on children during the installation of the infusion, by using nonpharmacological methods that are widely used are distraction techniques. Distraction techniques are very effective for transferring pain, as distractions are a way to reduce pain and distract patients who are often more tolerant of pain (Kurdaningsih et al., 2021).

Some studies have shown that visual distraction techniques using animated media have a significant influence on reducing pain levels in children during medical procedures. Children who watched animated videos during infusion procedures showed a significant decrease in pain scores compared to control groups that did not get distractions. during blood collection. Additionally, the benefits of audiovisual distractions can reduce pain and anxiety simultaneously, making them a very useful intervention in pediatric nursing practice. Patients feel more comfortable, relaxed, and feel like they are in a more pleasant situation

Based on interviews with the implementing nurse at the ER of Multazam Hospital, it is known that most children cry and refuse when they are about to be inserted with an IV. Some children shout, turn their faces, or close their eyes with their hands. The nurse also said that the child's cooperation during the procedure was very low, and often the action had to be carried out with the help of a parent or more than one officer. However, some nurses say they have started to apply simple distraction techniques, such as inviting children to watch animated shows from their parents' phones or room televisions during the procedure. However, the application of this technique is still incidental and has not yet been part of a structured nursing intervention or scientifically evaluated for effectiveness.

## **RESEARCH METHODS**

### **Place and Time of Research**

This research has been carried out at Multazam Hospital in December 2025.

### **Research Methods**

This research was conducted using quantitative research methods. Quantitative Research is research that is based on the collection and analysis of numerical (numerical) data to explain, predict, and control the phenomena of interest. In this study the intervention group and control group were selected not randomly so that the design in this study is in the form of a Nonequivalent (Pretest and Posttest) Control Group Design. The research design carried out was divided into two groups, namely the group that was given an action with a distraction technique (intervention group) and a group that was not given a distraction technique (the control group) after the action was carried out by approaching, importing data, and observation (Indarwati et al., 2020).

### **Population and sample**

The population in this study is pediatric patients who are in the ER of Multazam Hospital. It is known that

the population in the last 1 year is 149 pediatric patients and infusion procedures are carried out at the age of 3-5 years. Samples are some elements of the population that are used as the object of research. Samples are representative of the population whose characteristics will be expressed and will be used to assess the characteristics of the population (Neolaka, 2016). The sample in this study consisted of 30 pediatric patients in the ER at the age of 3-5 years, taken from a total population of 149 pediatric patients in the ER of Multazam Hospital.

### Data Analysis Techniques

#### Univariate Analysis

Univariate analysis Univariate analysis is used to obtain information about respondent characteristics (Indarwati et al., 2020). In this study, univariate analysis was applied to collect data related to age variables and the level of pain felt during infusion insertion.

#### Bivariate Analysis

Bivariate analysis is a type of analysis that is carried out on two variables (variable independent and variable dependent) It is used to determine the effect of audiovisual distribution techniques on the level of pain due to IV insertion in children by analyzing the test of the intervention group that does not use the distribution technique and the intervention group that uses the distribution technique while playing the video of the Cocomelon cartoon, Tayo the Little Bus, and Omar & Hana. The statistical test used in this study is the Chi Square Test.

## RESULTS

### Respondent Characteristics

Table 1 Frequency distribution of respondents by characteristics

Characteristics	Categories	Frequency (n)	Introduce yourself (%)
Age	3-4 Years	13	46.4
	4-5 Years	15	53.6
	<b>Total</b>	<b>28</b>	<b>100</b>
Gender	Male	14	50
	Women	14	50
	<b>Total</b>	<b>28</b>	<b>100</b>
Inpatient Experience	First time	14	50
	Once (1-2 times)	10	35.7
	Frequent (more than 2 times)	4	14.3
	<b>Total</b>	<b>28</b>	<b>100</b>

Source: Primary Data 2025

Based on table 1, it is known that most of the respondents are in the age group of 4–5 years, namely 15 respondents (53.6%), while respondents with the age of 3–4 years are 13 respondents (46.4%). This shows that the majority of respondents are in the late preschool age range.

Based on gender characteristics, the number of male and female respondents was the same, as many as 14 respondents (50%) each, so that the distribution of respondents based on gender was relatively balanced.

Theoretically, biological, psychological, and social differences between boys and girls affect the way they feel and channel pain. Some studies show that girls tend to be more sensitive to pain and more expressive in showing pain responses than boys (Suwondo et al., 2017). Biologically, hormonal differences are thought to affect pain thresholds. At an early age, these differences are not too prominent. However, girls still have a lower pain threshold than boys. As a result, they are quicker to feel pain and show emotional reactions, such as crying or rejecting action (Hockenberry & Wilson, 2019).

Therefore, in general, boys are considered to have better pain tolerance abilities than girls. This is not solely because the intensity of the pain they feel is milder. Instead, the difference is due to the way they express and control the response to pain. However, this distinction is not absolute. The perception of pain in children is also strongly influenced by previous experiences, anxiety levels, and environmental support during medical procedures. This study shows a balanced distribution of respondents between males and females by gender. This balance is beneficial because it can reduce gender bias towards research results. As a result, changes in pain levels were more attributable to the effectiveness of the intervention through the disruption of the animation cartoon watching technique, rather than differences in the biological characteristics of the respondents.

Based on their experience of hospitalization, most of the respondents were the first respondents to undergo treatment, namely 14 respondents (50%). Furthermore, respondents who had undergone hospitalization 1-2 times amounted to 10 respondents (35.7%), while respondents who often underwent hospitalization more than twice were 4 respondents (14.3%). This shows that most respondents still have relatively limited hospitalization experience.

The process of hospitalization, or hospitalization, occurs when a child has to undergo treatment in a health

facility for a certain period of time due to the health problems he or she suffers. In children, these experiences often trigger high stress because they are faced with an unfamiliar atmosphere, painful medical procedures, and being separated from a comfortable and familiar home (Nursalam, 2020). According to Hockenberry and Wilson (2019), a history of previous hospitalizations can affect how a child reacts to subsequent nursing procedures. Children who have been treated tend to form special opinions about hospitals, whether they are positive or negative. If a previous bad experience, such as pain that wasn't handled properly or a traumatic invasive procedure, it can add to anxiety and sensitivity to pain in the future.

On the other hand, children with a better history of hospitalization, particularly with family support and a child-friendly nurse approach, typically show lower anxiety as well as a more controlled pain response. This suggests that the experience of being hospitalized is one of the elements that affects the way children perceive and respond to pain (Marlina et al., 2023). In addition, the experience of hospitalization is also closely related to the child's ability to cope with situations. Children who have never been treated usually react more intensely emotionally, such as crying, refusing procedures, or being excessively afraid when faced with invasive measures, including IV insertion. Therefore, nurses should take into account the child's history of hospitalization in planning interventions, such as using attention-focused methods to reduce pain and anxiety (Novitasari et al., 2021).

In this study, the history of hospitalization was used as one of the characteristics of the respondents because it could affect how much pain the child felt when the infusion was installed. Children who have never been treated tend to feel pain more strongly than those who are experienced, so appropriate non-drug interventions, such as audiovisual disorder techniques, are needed.

### Univariate Analysis

#### Overview of Pain Level During Infusion Insertion in Children Before Intervention (Pre-Test)

Table 2 Overview of Pain Level During Infusion Insertion in Children Before Intervention (Pre-Test)

Yes	Pain Level	Intervention		Controls	
		Frequency (n)	Introduce yourself (%)	Frequency (n)	Introduce yourself (%)
1	moderate pain	11	78.6	7	50%
2	Severe Pain	3	21.4	7	50%
<b>Total</b>		<b>14</b>	<b>100%</b>	<b>14</b>	<b>100%</b>

Source: Primary Data 2025

Based on Table 2, it is known that in the intervention group, most of the respondents experienced moderate pain, namely 11 respondents (78.6%), while respondents who experienced severe pain were 3 respondents (21.4%).

In the control group, the distribution of respondents' pain levels showed an equal number between moderate and severe pain categories, as many as 7 respondents (50%) each.

These results showed that prior to the intervention, most respondents in both groups experienced moderate to severe pain during IV insertion.

#### Overview of the Level of Pain During Infusion Insertion in Children After Intervention (Post-Test)

Table 3 Overview of the Level of Pain During Infusion Insertion in Children After Intervention (Post-Test)

Yes	Pain Level	Intervention		Controls	
		Frequency (n)	Present (%)	Frequency (n)	Introduce yourself (%)
1	Mild Pain	7	50%	0	0%
2	moderate pain	7	50%	7	50%
3	Severe Pain	0	0%	7	50%
<b>Total</b>		<b>14</b>	<b>100%</b>	<b>14</b>	<b>100%</b>

Source: Primary Data 2025

Based on Table 3, it is known that in the intervention group, the pain level of the respondents decreased, where 7 respondents (50%) were in the category of mild pain and moderate pain, and there were no respondents (0%) who experienced severe pain.

The results of the study showed differences in pain levels by gender. 7 male respondents were in the category of mild pain. Meanwhile, 7 female respondents are still in the category of moderate pain. According to the Gate Control Theory, visual impairment plays a role in partially closing the "gates" that send pain signals to the brain. In boys, this method is more successful in relieving pain impulses, so that the level of pain decreases to mildness.

On the other hand, in girls who are more sensitive and anxious, pain impulses can still escape even after the disorder has been applied, so the pain experienced remains in the moderate category (Melzack & Wall, 1965). Therefore, the findings that 7 male respondents experienced mild pain and 7 female respondents still experienced moderate pain after the intervention can be explained theoretically through differences in pain thresholds, pain expression, and emotional responses by gender. This difference is natural and does not indicate the ineffectiveness of the intervention, but rather shows that the response to the disorder technique is individual and influenced by the characteristics of the respondents.

Theoretically, the effectiveness of distraction techniques depends on the child's ability to fully concentrate on the stimulus provided. In some children, the focus on animated videos can shift back to the infusion procedure, especially when the needle pierces the skin. This results in technical disturbances being less than optimal, so that pain is still felt at a moderate level. Although visual distraction techniques, such as watching animated videos, are effective in reducing pain perception, these interventions do not necessarily eliminate pain completely. Some children in the intervention group still experienced moderate pain, which was influenced by biological, psychological, and situational factors. (Marlina et al., 2023).

Meanwhile, in the control group, there were no respondents who experienced mild pain (0%). Some respondents were in the moderate pain category, namely 7 respondents (50%), and the rest experienced severe pain, namely 7 respondents (50%).

These results suggest that after the intervention, the distribution of respondents' pain levels in the intervention group tended to be milder than in the control group.

### Bivariate Analysis

#### Normality Test

In this analysis, before bivariate analysis was carried out to determine the effect of the distraction technique of watching animated cartoons on the level of pain of respondents during infusion installation, a data normality test was first carried out.

The normality test in this study used Shapiro–Wilk, because the number of respondents in each group was less than 50 respondents.

Table 4. Test of Normality of Pain Score During Infusion Insertion in Children Before and After Intervention

Variable	Groups	Pre/Post	p value
Pain	Intervention Groups	Pre	0,096
	Control Group	Post	0,115
	Intervention Groups	Pre	0,115
	Control Group	Post	0,065

Source: Primary Data 2025

Based on Table 4, it is known that the Shapiro–Wilk significance value on the pre-intervention pain score (pre-test) in the intervention group was 0.096 and the control group was 0.115. Meanwhile, the Shapiro–Wilk significance value on post-test pain scores in the intervention group was 0.115 and the control group was 0.065.

All Shapiro–Wilk significance values showed  $p > 0.05$ , so it can be concluded that the respondents' pain score data before and after the intervention in both groups were normally distributed. Therefore, further data analysis can be continued using parametric statistical tests.

#### Paired Sample Test t-Test

The Paired Sample t-Test was conducted to determine the difference in the level of pain of respondents before and after the insertion of the infusion in the intervention group and the control group.

Table 4 Results of the Paired Sample t-Test of Respondents' Pain Level Before and After Intervention

Groups	Measurement	Red	SD	t	df	Sig. (p)
Intervention	Pre-Test	5,64	1,008	22,079	13	0,000
	Post-Test	3,50	0,941			
Controls	Pre-Test	6,50	0,941	1,000	13	0,336
	Post-Test	6,43	0,852			

Source: Primary Data 2025

Based on Table 5, the results of the Paired Sample t-Test in the intervention group showed that the average pain score of the respondents before being given the distraction technique of watching animated cartoons was 5.64, and after being given the intervention decreased to 3.50. The results of the statistical test obtained a value of  $p = 0.000$  ( $p < 0.05$ ), so it can be concluded that there is a significant difference between the level of pain of the respondents before and after being given the distraction technique of watching animated cartoons.

In the control group, the average pain score of respondents before infusion was 6.50 and 6.43 after infusion. The results of the Paired Sample t-Test showed a value of  $p = 0.336$  ( $p > 0.05$ ), which means that there was no

significant difference between the level of pain of the respondents before and after the insertion of the infusion in the control group. Statistically, mean or average values have an important role in describing the central tendency to numerical data, which is a number that reflects the overall of individuals in a group. In pain research, it is applied to show the average intensity of pain felt by participants at a certain moment of evaluation, such as before or after an intervention (pre-test or post-test).

Based on the concept of acute pain theory, the strength of pain tends to decrease over time, due to the body adapting to pain stimuli. When the infusion has been installed, the nociceptive stimulation needle is reduced, so the understanding of pain decreases spontaneously. This has the potential to trigger a decrease in the average value of pain in the control group (IASP, 2022). There is a strong link between anxiety and how a person feels pain. In the early stages before the test, children usually feel very anxious because they expect pain. When the procedure is complete, their fear levels drop, which then makes the perception of pain also reduced, even in the absence of attention-focusing techniques. This condition can have an impact on changes in the average value of pain in the control group (Birnie et al., 2021).

Pain is a personal experience and is influenced by pain tolerance limits, age, gender, and previous experience history. These variations in individual responses can trigger changes in pain scores between measurement times, which are ultimately reflected in the shift in the control group's mean values (IASP, 2022). In studies that applied pre-test and post-test designs, the study subjects might give different answers to the second measurement because they understood the pain scale used. Children may rate their pain lower on post-tests because they are familiar with measuring instruments, so the average control group also changes statistically (Polit & Beck, 2021).

Thus, it can be concluded that a significant decrease in pain levels was only found in the group given the intervention of the distraction technique of watching animated cartoons, while in the control group there was no significant change in pain level.

### Independent Sample T-Test

The Independent Sample t-Test was performed to determine the difference in average decrease in pain level (pain delta) between the intervention group and the control group after infusion insertion.

Pain delta is the difference between pre-test pain score and post-test pain score. The pain delta value is used to describe the magnitude of the change or decrease in the level of pain experienced by the respondent. The greater the value of the pain delta, the greater the decrease in the level of pain that occurs.

Table 5 Results of the Independent Sample t-Test Differences in Pain Delta between the Intervention Group and the Control Group

Variable	Groups	N	Red	SD	t	df	Sig. (p)
Delta Pain (Pre-Post)	Intervention	14	2,14	0,363	17,190	26	0,000
	Controls	14	0,07	0,267			

Source: Primary Data 2025

Based on Table 6, the average decrease in pain level (pain delta) in the intervention group was 2.14, indicating a considerable decrease in pain level after being given a distraction technique of watching animated cartoons. Meanwhile, the average pain delta in the control group was only 0.07, suggesting that the decrease in pain occurred very minimally in respondents who were not given intervention.

The results of the *Independent Sample t-Test* showed a value of  $p = 0.000$  ( $p < 0.05$ ), which means that there was a statistically significant difference between the reduction in pain levels in the intervention group and the control group.

The difference in pain delta values showed that the group given the intervention experienced a much greater reduction in pain than the control group. Thus, it can be concluded that the distraction technique of watching animated cartoons was effective in lowering the pain level of the respondents during the insertion of the infusion.

## DISCUSSION

### Pain level during IV insertion before the intervention

Based on the results of the study, it is known that before the intervention was given, it was shown that most children experienced moderate to severe pain. The situation is in line with the concept of acute pain, which explains that invasive procedures such as infusion installations can stimulate nociceptors due to injury to the tissues, thus generating pain signals that are sent through peripheral nerves to central nerves. Among children, the experience of pain is often exacerbated by anxiety and fear, which ultimately increases the strength of the pain they feel.

Most of the children in the intervention group experienced moderate pain (78.6%) and a small percentage experienced severe pain (21.4%). In the control group, the distribution of pain levels showed an equal proportion between moderate pain and severe pain, by 50% each. Based on the results of the study, most of the respondents in the intervention group experienced moderate pain before being given the intervention, namely 11 respondents (78.6%). Moderate-intensity pain in the act of infusion insertion indicates that most children feel sufficient

discomfort, but are still at levels that are possible to be psychologically controlled without extreme responses such as severe pain.

This moderate pain can be influenced by several factors, including anxiety about invasive actions, uncertainty about procedures, and lack of attention to the cause of the pain. In addition, previous experience of pain can increase the child's focus on the unpleasant sensations that arise when the needle enters the tissues, thereby increasing the perception of moderate-level pain.

These findings are consistent with the concept of pain described in the *Gate Control of Pain* theory, which states that the perception of pain is not only the result of physical stimuli, but is also influenced by individual cognitive and emotional processes. Stimuli of focus, attention, and emotional experiences can open or close "pain gates" in the spinal cord that affect how strongly pain a person feels. Attention disorders or high fear can make the pain waves more felt by the child. This explanation is commonly used in clinical pain theory, for example by Melzack and Wall (1965) who explain the mechanism of pain modulation through psychological aspects.

In addition to moderate pain, as many as 3 respondents (21.4%) in the intervention group experienced severe pain. This severe pain reflects a stronger response to the pain stimulus produced by the insertion of the IV. This group showed that a small percentage of children not only experienced discomfort, but also intense discomfort that was more difficult to control psychologically.

Severe pain can be affected by several factors such as extreme fear of the procedure, lack of coping skills, and lack of attention distractions. High anxiety factors in children can enrich attention to pain sensations, resulting in more intense pain experiences. Similarly, previous negative experiences with the medical world can make pain receptors more sensitive during invasive procedures.

the acute nature of pain arising from invasive procedures, as already discussed in Chapter II, in which the injection of an infusion provokes a nociceptive reaction that is aggravated by psychological aspects such as anxiety and fear in the child. In the pre-season, the child's capacity to understand the steps of medical treatment and to regulate the response to pain is still very minimal, so they usually focus entirely on the uncomfortable sensations they are experiencing.

The predominance of moderate pain categories before the intervention suggests that although pain is felt quite significantly, the child is still at a level of pain that can theoretically be modulated through a nonpharmacological approach. This strengthens the basis for the selection of distraction techniques as a nursing intervention in this study.

These findings are in line with pediatric nursing theories that emphasize that pain is subjective and multifactorial, influenced by the individual's psychosocial and emotional context. The American Pain Society states that emotions and situational context can worsen or alleviate the perception of pain. In addition, *the Theory of Pain Perception* in the medical literature asserts that emotional experiences such as fear increase nociceptive neurotransmission so that the perception of pain can increase to severe levels.

Research by Munir et al. (2023) It shows that a small percentage of pediatric respondents may experience severe pain during invasive procedures such as IV insertion when distractions are not provided or are less than optimal. For example, a study at Sultan Sulaiman Hospital found that without effective distractions, children's pain levels remained high and were categorized as severe in some respondents.

Based on the results of the study, in the control group before the intervention was given, it was seen that the distribution of the respondents' pain level showed an equal proportion between moderate pain and severe pain, each by 50%. These findings showed that half of the respondents experienced pain of moderately annoying intensity (moderate pain), while the other half experienced severe pain characterized by intense discomfort and a stronger emotional response. This condition reflects that the insertion of the infusion can produce significant variations in pain perception in respondents in the absence of pain management interventions.

The moderate pain and severe pain experienced by respondents in the control group could be influenced by several factors. Key factors include anxiety and fear of invasive procedures such as IV insertion, which trigger intense emotional responses in some children. In addition, previous experiences of pain or lack of psychological support during the procedure can reinforce the perception of discomfort. The difference in pain threshold between individuals is also an important factor; Respondents with low pain thresholds tended to feel more severe pain compared to respondents with higher pain thresholds. This complex interaction between physiological and psychological factors may explain why some respondents feel moderate pain, while others feel severe pain at the same action.

This phenomenon is in line with the concept of pain as a subjective sensory and emotional experience, as explained in research and guidelines for assessing children's pain. In *Gate Control Theory* Melzack and Wall argue, the perception of pain is not only influenced by physical stimuli, but also by psychological conditions such as attention, anxiety, and emotional experiences of pain. Disruption of this pain modulation process can cause the pain experience to become more intense, especially in children who feel afraid or unprepared for medical procedures. Pain assessments in children using observational scales such as FLACC or numerical scales also show that severe pain is associated with strong emotional responses such as crying loudly or refusing medical measures, reflecting the activation of more complex pain pathways (Su et al., 2021).

Based on the results of the above research, the researcher assumed that the high level of pain before the

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intervention in both groups was caused by the absence of non-pharmacological pain management efforts that were given in a structured manner before the infusion procedure, so that the child fully felt the pain stimulus without any distraction.

#### **Pain level during IV insertion after the intervention**

Based on the results of the study, after being given a distraction technique intervention to watch animated cartoons, there was a change in the distribution of pain levels in the respondents. In the intervention group, 7 respondents (50%) were in the categories of mild and moderate pain, and no respondents were found to experience severe pain (0%). This shows that after the intervention, the majority of respondents experienced pain at a lower intensity. In contrast, in the control group, there were no respondents with mild pain (0%), while 7 respondents (50%) experienced moderate pain and 7 respondents (50%) experienced severe pain, indicating that without visual distraction intervention, pain remained at moderate to severe levels.

Based on the results of the study, the distribution of pain levels in the intervention group showed significant changes. Each of 7 respondents (50%) was in the category of mild and moderate pain, and no respondents were found to experience severe pain (0%). These findings showed that after the intervention, the majority of respondents experienced pain at a lower intensity than before the intervention, so the visual distraction intervention played a role in lowering pain levels during infusion insertion.

The decrease in pain levels in this intervention group can be influenced by the effectiveness of visual distractions in distracting respondents from the pain stimulus. Watching animated cartoons provides a pleasurable visual and emotional stimulus, so the respondents' focus is not entirely on the invasive procedure performed. This distraction can reduce anxiety, tension, and fear of the IV needle, which has been known to be the main factor in increasing pain perception in children.

These findings are in line with the concept of pain described in the Gate Control Theory of Pain, which states that pain perception is influenced by the interaction between physical stimuli and psychological factors, such as attention and emotions. Visual distractions serve as non-nociceptive stimuli that can "close the pain gates", so that the transmission of pain impulses to the brain is reduced. With effective distractions, the perception of pain felt by respondents becomes milder or moderate, and does not develop into severe pain.

In terms of conceptualization, these findings can be linked to the pain modulation theory that has been discussed in Chapter II, especially the section on how attention affects the understanding of pain. Distraction through audiovisual acts as a competing stimulus, thereby reducing the child's concentration on pain stimuli and reducing the natural strength of pain. In short, a meaningful reduction in pain in the intervention group is practical evidence of that theoretical idea.

The results of this study are also in line with research in Indonesia conducted by Fitriani and Ramadhani (2022) which stated that the provision of audiovisual distractions in the form of cartoon videos significantly reduced the intensity of pain in children during the infusion procedure. Another study by Nurfadilah et al. (2021) also showed that children who were given visual distractions were more in the category of mild and moderate pain than the group without intervention, and almost no severe pain was found in the group that received the distraction.

Meanwhile, in the control group after the infusion injection, there were no respondents who experienced mild pain (0%). Some respondents were in the moderate pain category, namely 7 respondents (50%), and the rest experienced severe pain, namely 7 respondents (50%). This distribution showed that in the absence of visual distraction interventions, respondents' pain levels tended to remain at moderate to severe intensity, and did not experience a significant decrease.

The high level of pain in the control group may be due to the absence of distraction during the infusion insertion procedure. Respondents tend to focus entirely on the pain caused by a needle prick, so the perception of pain becomes stronger. Anxiety factors, fear of medical procedures, and previous pain experiences can also aggravate the pain response. In addition, the lack of positive stimulation during the action causes respondents to have difficulty controlling emotional reactions, which contributes to the high intensity of pain.

This condition is in line with the concept of pain as a subjective experience that is influenced by physiological and psychological factors. In Gate Control Theory, the absence of diverting stimuli such as distractions causes the "pain gate" to remain open, so that pain impulses can be optimally transmitted to the central nervous system. As a result, pain is felt more intensely and can reach the category of severe pain, especially in respondents who have a low pain threshold or high anxiety levels.

These results are also consistent with previous research in Indonesia. Research by Munir et al. (2023) shows that children who are not given distractions during invasive procedures tend to experience moderate to severe pain. The study concluded that without nonpharmacological interventions, such as visual distractions, the child's perception of pain during medical procedures did not experience a significant decline and remained in the higher pain category.

#### **The Effect of Distraction Techniques on Watching Animated Cartoons on Children's Pain Levels**

Based on the results of the Paired Sample t-Test in the intervention group, it was known that the average pain score of the respondents before being given the distraction technique of watching animated cartoons was 5.64

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and after the intervention decreased to 3.50. The results of the statistical test showed a value of  $p = 0.000$  ( $p < 0.05$ ), which means that there was a significant difference between the level of pain before and after the intervention. These findings suggest that the distraction technique of watching animated cartoons is effective in lowering the child's pain levels during IV insertion.

These results are in line with the concept of pain in children which states that pain is a sensory and emotional experience that is influenced not only by physical stimuli, but also by psychological factors such as attention, anxiety, and stress (Marlina et al., 2023). In invasive procedures such as IV insertion, children often experience anxiety and fear that can aggravate the perception of pain. The provision of visual distractions in the form of watching animated cartoons is able to divert the child's attention from the invasive procedure, so that the perception of pain felt becomes lighter.

Theoretically, this finding can be explained through the Gate Control of Pain Theory put forward by Melzack and Wall. This theory explains that non-nociceptive stimuli, such as visual and auditory stimuli, can close the "pain gates" in the central nervous system so that the transmission of pain impulses to the brain becomes inhibited. In this study, visual stimuli in the form of watching animated cartoons acted as an effective distraction, so that the pain impulse due to the insertion of the IV was not fully perceived by the child. This is in accordance with the concept that has been explained in Chapter II that visual distraction is one of the effective nonpharmacological interventions in the management of children's pain.

In contrast, in the control group, the average pain score before infusion was 6.50 and after infusion was 6.43 with a  $p$  value = 0.336 ( $p > 0.05$ ), indicating no significant difference. These results show that without the provision of distraction interventions, the pain felt by the child tends to settle. This condition is in accordance with the concept of pain due to invasive actions in children, where the installation of an infusion can cause moderate to severe pain if it is not accompanied by adequate pain management efforts (Hockenberry & Wilson, 2019).

The results of this study reinforce the concept that audio-visual distraction techniques, especially watching animated cartoons, are an effective nonpharmacological intervention in reducing children's pain levels during IV insertion. These findings also support the application of distraction techniques as part of pediatric nursing practice to minimize the physical and psychological impact of pain during invasive procedures.

In this study, the action applied to the intervention group was an attention technique through the playing of animated cartoons during the infusion installation process. Animated cartoons were chosen as a distraction tool because they present attractive visual and sound elements, vivid colors, and a concise storyline so that it suits the child's level of understanding based on the developmental phase of his age.

Theoretically, animated cartoons can shift a child's focus from painful stimuli to pleasurable non-painful stimuli. Entertaining cartoon content can reduce the child's attention to invasive procedures, so that the pain signals sent to the brain can be muted. This is in line with the Gate Control theory, which explains that non-pain stimulation such as visual and auditory can partially block the pathways of pain delivery to the central nervous system.

In this study, the animated cartoons used were selected by considering the criteria for the child's age suitability, safe content, and the length of time adjusted to the duration of the infusion installation. The selection of cartoons is not only focused on one specific title, but is adjusted to the child's tastes to increase appeal and concentration during the intervention. This strategy is expected to increase the effectiveness of the focus of attention and create a more comfortable environment for the child during the treatment procedure.

However, the variation in the child's interests and views on the type of cartoon shown can affect the level of effectiveness of the distraction. Not all children respond similarly to certain animated cartoons, so the pain reduction that occurs is individual. This condition may explain the difference in post-intervention pain levels in participants. Therefore, the use of animated cartoons as a mindfulness tool in this study has been shown to be effective in reducing children's perception of pain during IV insertion, although the results affect the child's personal characteristics and preferences for the content presented.

Thus, the researcher assumes that the decrease in the child's pain level after being given the distraction technique of watching animated cartoons is influenced by the ability of visual distraction to divert the child's attention from the IV insertion procedure to a more pleasurable stimulus. When the child's attention is focused on watching a cartoon, the child's level of anxiety and emotional tension tends to decrease, so the perception of pain felt becomes lighter. In addition, a more comfortable atmosphere during the action is suspected to support the effectiveness of distraction techniques in reducing children's pain levels.

### **Differences in Decreased Pain Level (Pain Delta) between the Intervention Group and the Control Group**

Based on the results of the Independent Sample t-Test analysis, it is known that the average decrease in pain level (pain delta) in the intervention group was 2.14, while in the control group it was only 0.07. The results of the statistical test showed a value of  $p = 0.000$  ( $p < 0.05$ ), which means that there was a significant difference between the reduction in pain levels in the intervention group and the control group. These findings suggest that the reduction in pain in the group given the distraction technique of watching animated cartoons was statistically and clinically more meaningful than in the group that was not given the intervention.

The considerable difference in pain delta values between the two groups indicates that visual distraction techniques play an important role in modulating children's pain perception during infusion. In the intervention

group, visual stimuli in the form of animated cartoons were able to divert the child's attention from the pain stimulus, so that the child did not fully focus on the invasive procedure being performed. In contrast, in the control group, the child was only directly exposed to the act of inserting the infusion without any distraction, so that the perception of pain did not experience significant changes.

A greater decrease in pain in the intervention group occurred because the child received an attractive visual stimulus that was appropriate to the stage of development, so that the child's attention was diverted from the IV insertion procedure. This distraction causes the child not to focus on pain stimuli, while reducing anxiety which can aggravate the perception of pain.

In contrast, in the control group, the child did not get a distraction stimulus so that attention was entirely focused on the invasive procedure, including looking at the needle and experiencing the sensation of the stabbing directly. This condition causes pain impulses to be processed optimally by the brain without any inhibition, so that the level of pain felt by the child is relatively fixed and does not decrease significantly.

These results are in line with the Gate Control of Pain Theory, which explains that non-nociceptive stimuli such as visual and auditory stimuli can inhibit the transmission of pain impulses to the central nervous system by closing the "pain gate". When the child's attention is diverted through the spectacle of animated cartoons, the pain impulses coming from the IV insertion area become less dominant, so the perception of pain felt decreases significantly. In contrast, in the absence of distractions, the pain gates remain open so that pain impulses are received optimally by the brain.

The findings of this study are supported by several studies in Indonesia. Research by Putri and Handayani (2021) showed that audio-visual distractions in the form of cartoon videos significantly reduced the pain scores of preschoolers during IV insertion compared to the control group. Another study by Sari et al. (2022) also reported that visual distraction techniques were effective in reducing the intensity of procedural pain in children, with significantly greater pain-reduction values in the intervention group compared to the non-distraction group. In addition, Rahmawati et al. (2023) concluded that the provision of distractions to watch animation was able to reduce anxiety and pain simultaneously in children during invasive procedures in hospitals.

The results of the Independent Sample t-Test in this study confirm that the distraction technique of watching animated cartoons is not only effective in reducing pain individually (intragroup), but also proven to be significantly superior to no intervention (intergroup). These findings reinforce the recommendation to use visual distraction techniques as a safe, easy to apply, and effective nonpharmacological intervention in pediatric nursing practice, particularly in IV insertion procedures.

Thus, the researchers assumed that the significant difference in decreased pain levels (pain delta) between the intervention group and the control group was due to the existence of effective distraction in the intervention group through the distraction technique of watching animated cartoons. These distractions help reduce anxiety and increase the child's sense of comfort during the IV, so that the perception of pain felt becomes lower. In contrast, in the control group that was not given distraction interventions, the child remained focused on the invasive procedure, so that the decrease in pain levels occurred was relatively minimal.

## CONCLUSION

1. The level of pain during IV insertion in the intervention group was dominated by mild pain and moderate pain at 50% (7 respondents), and no severe pain (0%), while in the control group there was a higher level of pain.
2. Audiovisual distraction techniques in the form of watching animated cartoons were proven to reduce children's pain levels, shown by an average decrease in pain (pain delta) of 2.14 in the intervention group, higher than the control group of 0.07.
3. There was a significant difference in the rate of pain reduction between the intervention group and the control group with the results of the Independent Sample t-Test  $p = 0.000$  ( $p < 0.05$ ).

## SUGGESTIONS

1. For Nurses  
The distraction technique of watching animated cartoons can be used as a simple, affordable, and non-invasive nursing intervention to help lower the child's pain during IV insertion, as well as can be applied in daily nursing practice.
  2. For Parents  
Parents are expected to be actively involved in accompanying the child during the infusion procedure by providing simple distractions, such as showing the child's favorite cartoon before and during the procedure.
  3. For Children  
The application of audiovisual distraction techniques is expected to increase children's sense of comfort and reduce anxiety when undergoing medical procedures, so that the treatment experience in the hospital becomes more positive.
  4. For Researchers  
This research can be the basis for future researchers to develop and compare various distraction techniques in the management of child pain based on evidence-based nursing.
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