IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals

Human Journals
Review Article
December 2021 Vol.:20, Issue:2

A Review of Immunization Distraction Techniques for Pain Intervention in Young Children

IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals

Katie E. Gerndt[1], Rebecca L. Luzney[1], Christina A. Moyer[1], Samuel P. Abraham[2*]

[1]Bethel University School of Nursing, Mishawaka, Indiana, USA

[2]Associate Professor of Nursing, Bethel University School of Nursing, Mishawaka, Indiana, USA*

Submitted: 25 November 2021
Accepted: 30 November 2021
Published: 30 December 2021

Keywords: Immunizations, pain, children, adolescents, techniques, intervention, distraction

ABSTRACT

Background: This is a review concerning immunization distraction techniques and pain in young children. This review includes current evidence-based research regarding distraction techniques and pain with immunizations in children. **Purpose:** The purpose of this literature review was to evaluate the effectiveness of distraction to decrease pain and discomfort with pediatric patients. **Method:** The method used in this study was to review the literature and collect data on the association between distraction techniques and pain while administering immunizations to children. Databases used for searching resources include the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and ProQuest Central. The references used in this study are ranked on the hierarchy of evidence, with the top tier containing the strongest evidence and the bottom tiers containing the weakest evidence. This review contains most studies from the top four tiers of the hierarchy of evidence. The review was based on the patient, intervention, comparison, and outcome (PICO) question: In young children, do distraction techniques during immunization administration result in decreased reported pain when compared to no distraction interventions? **Results:** Results indicated the impact of virtual reality on pain, the impact of visual interventions, the impact of hands-on interventions, and the impact of parental guardian involvement as distraction techniques. **Conclusion:** Overall, it was found that utilizing distraction during immunizations and other medical procedures decreases reported n among pediatric patients.

INTRODUCTION

Vaccines are widely encouraged for pediatric patients and are often required in education settings. The current Advisory Committee on Immunization Practices (ACIP) recommendations is essential in understanding the timeline necessary for the immunization schedule [1]. Immunizations can significantly decrease the chances of acquiring a childhood illness and subsequent hospitalization as a result. The concept of immunizations is simple. A needle is attached to a syringe and inserted into the patient's muscle or subcutaneous tissue. However, the pediatric patient can experience a tremendous amount of fear and anxiety as a result [2]. The overall experience for both the patient receiving the immunizations and the parental guardians involved (if applicable) can become an encouraging and less anxiety-producing process. The purpose of this literature review was to evaluate the effectiveness of distraction to decrease pain and discomfort in pediatric patients. The research was based on the following patient, intervention, comparison, and outcome (PICO) question: In young children do distraction techniques during immunization administration result in lower pain scores when compared to no distraction interventions?

Background

Whether a planned doctor's office visit or a trip to the emergency room, medical procedures on pediatric patients can be a very traumatic experience for those patients. One of the most common painful experiences for pediatric patients is needle-procedures, like intravenous (IV) placement and venipunctures [3]. It is reported that 25–30% of children develop post-traumatic stress symptoms (PTSS), and 10–20% are considered to have experienced post-traumatic stress disorder (PTSD) after going through a procedure where techniques to reduce pain were not utilized [4]. Many children who experience needle-procedures report unbearable pain during the procedure [5]. Ensuring that children receive appropriate interventions to control their pain is essential to improve their pain management.

The current recommendations are that children should be receiving 20 to 30 vaccinations before the age of 18, many given before age ten [6]. With the knowledge that needle-procedures are considered the most stressful for pediatric patients, providers should utilize techniques to reduce pain while giving care. When providers neglect pain management during invasive procedures,

the patient's physical and psychological health may be negatively impacted [5]. Using distraction during procedures is one method that aims at reducing pain by refocusing the child on something other than the pain-causing procedure [5]. The use of various distraction techniques reduces fear and anxiety by directing focus toward something pleasant for the patient [7]. Integrating both pharmacological and nonpharmacological interventions, such as distraction, has shown to be effective in reducing pain and anxiety in pediatric patients undergoing procedures [7].

While managing the pediatric patient's pain and anxiety is important during the procedure, it is also vital to prevent trauma for children, which may increase anxiety for future medical procedures [3]. When children experience medical trauma, it may interfere with further medical care and will impact the patient and their family [4]. Many adults are reported to have a fear of needles, often developing in childhood due to poorly managed anxiety [8]. When using appropriate distraction aids throughout a medical procedure, children are made more comfortable and their anxiety is decreased [9]. When providers develop effective strategies to manage distress, they promote coping and resilience for their pediatric patients [10]. Managing pain and anxiety in pediatric patients will create a better experience for both the children and caregivers.

METHOD

This literature review included extensive and detailed research using CINAHL and ProQuest Central. Using the search terms "pediatric patient," "distraction techniques," "immunization," "medical procedures," and "children," many scholarly studies were reviewed, were presented, and accessible for further review (see Table 1). These search terms can also be identified as key terms within this study, meaning they are important terms relating to the topic. The search was limited to studies published as early as 2015 up through November 2021. The 15 studies that were found applicable were screened and classified into the top 6 tiers of the 'Evidence Hierarchy' [11]. Several studies were inspected to find effective interventions related to immunizations or other painful medical procedures in the pediatric population. The sources that were found gave diverse information, statistics, and different distraction methods ranging from virtual reality, pharmacological techniques, visual, hands-on, as well as parental guardian involvement. All journals were evaluated to obtain the best possible quality sources.

Results of Search

Table No. 1: Search Strategy and Limitations

Database Searched	Date of Search	Search Strategy and Limitations	Number of Studies Found	Estimate of Relevant Studies	Studies Used
Cumulative Index of Nursing and Allied Health Literature (CINAHL)	9/15/2021	Key terms: pediatric patients, distraction techniques, immunization, medical procedures, children Limitations: Last 5 years; English; Linked full text	445	25	12
ProQuest Central	11/1/2021	Key terms: Immunizations, Distraction Techniques, Pain, Young Children Limitations: Last 5 years; English; Linked full text	350	10	3

Relevant Studies Chosen

To rank the quality and the strength of the evidence found within the studies, the levels of evidence hierarchy were utilized. The level with the strongest evidence is level one, whereas the level with the weakest evidence is level seven [11]. The majority (13 out of 15) of the studies utilized were from the top four tiers, with one article from level five and one from level six (see Figure 1). All the studies used evidence-based research to address the main topic.

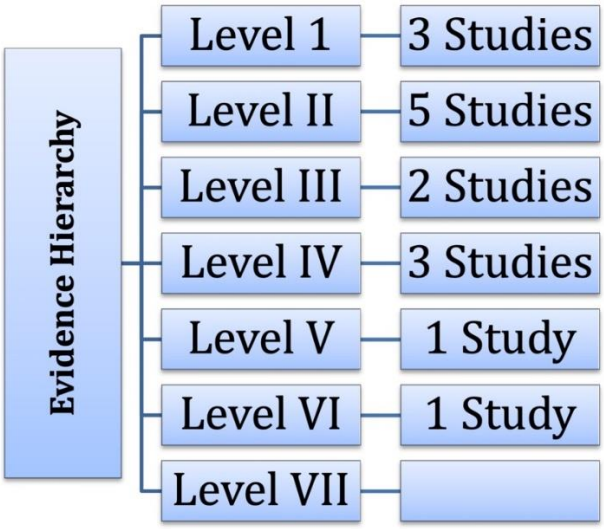

Figure No. 1: Level of evidence for studies used in the study

LITERATURE REVIEW

Key findings are identified and discussed in this section. Findings included virtual reality, visual interventions, hands-on interventions, and parental guardian involvement. These key findings capture the essence of the review and bring in a lot of valuable information. Some studies acknowledged the potentially positive effects of distraction intervention for pain. These findings are also discussed.

Virtual Reality

Virtual reality (VR) is a newly developed technology that provides an artificial form of computer simulation for the user. In a medical environment, VR allows the patient to alter their visual surroundings aiding as a distraction technique during painful medical procedures [3]. Research confirms that during a painful medical procedure, the patient perception of pain can increase in relation to higher levels of anxiety [12]. The reduction of pain for patients, especially pediatric patients, is imperative in preventing trauma in childhood that could eventually follow them into their adult lives. Using distraction techniques is more effective when the pediatric patient is engaged in something other than the procedure, such as VR. VR can be utilized in settings where pediatric patients may undergo painful procedures [8]. Overall, VR is beneficial in allowing the patient to manipulate their environment and dictate where they put their attention [12]. As seen

in Figure 2, virtual reality applications used in the hospitals include throwing snowballs at animals, visiting a zoo, exploring the underwater world, shooting balls at animated teddy bears, launching different types of food to hungry animals, and matching colored bricks [13].

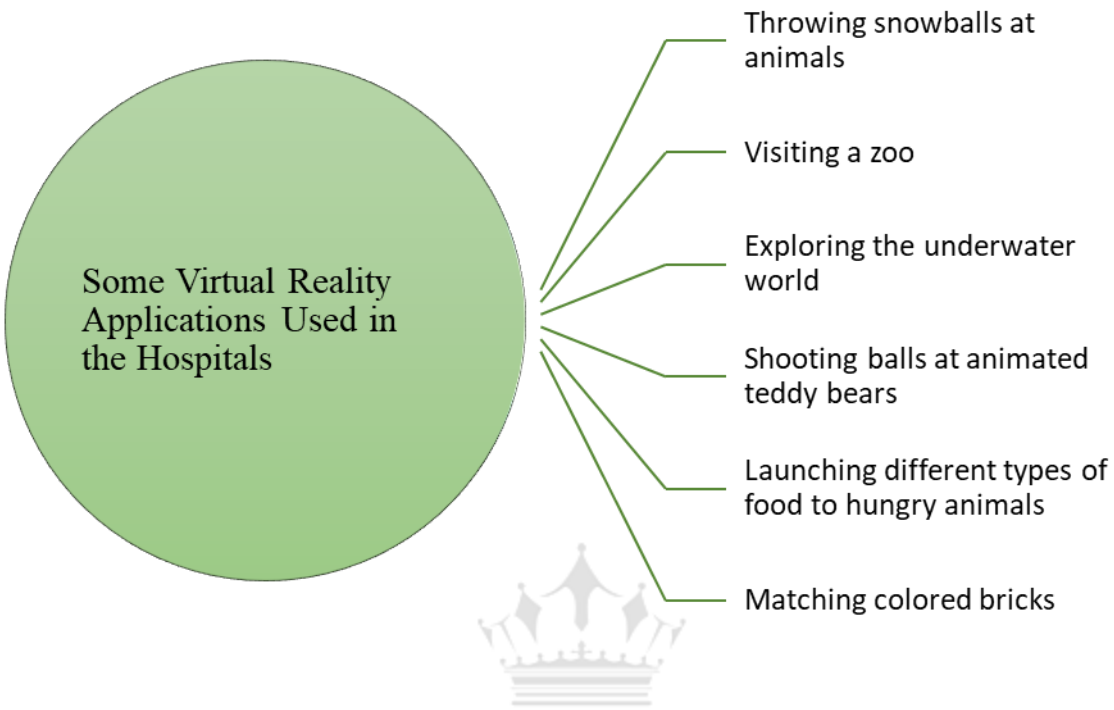

Figure No. 2: Virtual reality applications used in the hospitals

The concept of virtual reality acts on the patient's perception of pain through attention, emotion, and concentration [13]. Across the board, when VR was implemented as a distraction technique, the patient's self-report of pain and anxiety was dramatically decreased. Patient satisfaction improved in many different environments. For the influenza vaccination, patients who used VR before, during, and after the administration of the vaccine reported a 45-74% decrease in pain compared to receiving an immunization without the use of VR [13]. During one study, the Face, Legs, Activity, Cry, and Consolability (FLACC) scale was used to evaluate pain during a needle procedure. This occurred between a control and intervention group. The children in the intervention group reported a smaller FLACC score compared to the control group [3].

In a study including 11 burn patients, a 35-50% decrease in pain was reported while using VR along with pharmacological treatment compared to sole pharmacological treatment [13]. It has been found that the effects of using VR to reduce pain are comparable to the use of opioid

analgesics to control pain. During a needle procedure, both pediatric patients and their caregivers felt the distraction provided by VR was instrumental in reducing the patient's perception of pain. Their use of VR allowed the patients to feel as though they were in a different environment, ultimately easing their anxiety and improving pain management [4]. The effects of VR as a non-invasive form of distraction can immensely help pediatric patients manage their anxiety and in doing so decrease their perception of pain.

Visual Interventions

A type of nonpharmacological pain management method is a visual distraction that aids in improving patient satisfaction during painful procedures. There are multiple forms of visual diversion that can range from passive concepts like watching cartoons to active concepts such as interacting with video games. The child's involvement can determine the degree of pain relief and anxiety throughout the procedure. Compared to other distraction techniques, visual distraction provides a cost-effective intervention to relieve procedural pain in pediatric patients (see Figure 3). This intervention is also simple enough for both healthcare professionals and caregivers to implement into the patients' plan of care [6].

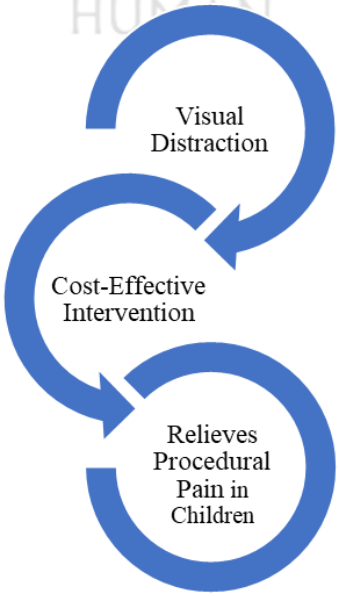

Figure No. 3: Visual distraction provides a cost-effective intervention to relieve procedural pain in pediatric patients

Both passive and active methods of pain reduction can effectively decrease patient pain. However, the active methods are considered to have a significantly higher impact. In another study, 180 pediatric patients were divided into four groups separated by activity [14]. The distractions included video games, cartoons, and parental interactions. There was also one control group where no intervention was in place. To identify the pain rating, the Wong-Baker scale was used. It is a scale that shows a group of faces ranging from a smiling face representing zero or 'no hurt,' to the other end of the spectrum, a 10, where there is a crying face representing 'hurts worse.' Using this scale, the more passive the intervention, the higher intolerance of pain was reported. This indicates that active interventions, such as video games are more impactful and decrease the patient's perception of pain [14].

With the use of inexpensive and easily accessible visual means of distraction, health care providers can positively impact the child's interactions. Anxiety-related to medical care is a common problem among pediatric patients. Negative associations with healthcare services can carry into later life, leading to potential avoidance of healthcare. Cerne *et al.* [15] argued the children's first introduction to health services can be made a positive experience which will decrease the number of developing pre-procedural anxiety or a fear of needles. When health care providers prioritize creating a positive environment for pediatric patients, and their developing perception of pain related to healthcare, it optimizes psychosocial and physical well-being.

Hands-On Interventions

Another type of non-pharmacological distraction technique for managing pain is hand-on intervention (see Figure 4). This is a form of kinesthetic activity, meaning it involves the movement of the body. Hands-on interventions can be beneficial to pediatric patients by allowing them to have greater physical involvement leading to an increased level of distraction. Hands-on interventions, such as squeezing a stress ball, can be implemented easily by healthcare providers to reduce general discomfort [5]. When healthcare professionals neglect pain management, the child's physical health is being affected, including increases in the demand for oxygen and affecting their blood glucose metabolism. The child's psychological health is also being negatively influenced due to neglectful behavior regarding pain management [5].

In one study regarding IV cannulation, it has been reported as the most common painful procedure in pediatric patients. Approximately 65% of children in this study reported that they experienced extreme pain during the process of an IV procedure [5]. Another study compared a control group to an intervention group that received the distraction of soap bubbles. The experimental group showed a drastic decrease in their perceived pain as well as a reduction in fear. On the other hand, the control group who did not receive any distraction interventions showed no significant reduction in either category. Anxiety during this experiment was measured by self-reports of the participants [7].

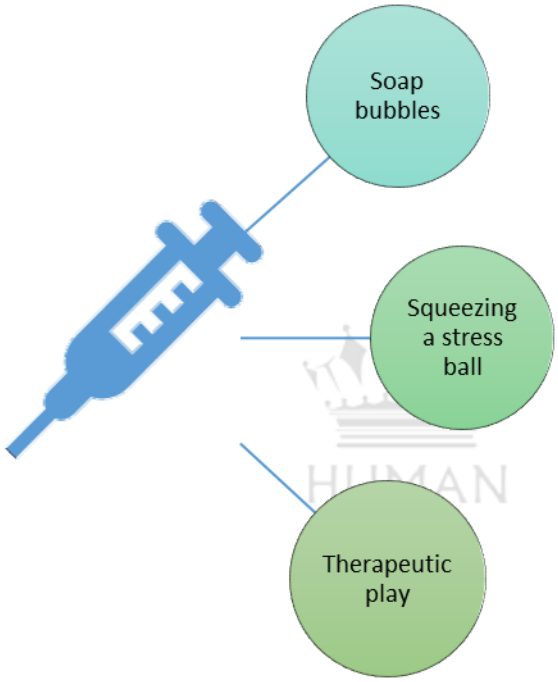

Figure No. 4: Hand-on intervention for non-pharmacological distraction technique for coping

When it comes to child development, an activity as simple as playing can dramatically increase their ability to function and grow. Not only does play provide social interactions among other children, but it also allows independent growth of skills, vocabulary, emotions, and expression. Bringing therapeutic play into the healthcare setting is used to reduce trauma among hospitalized children, evaluate their feelings and misunderstandings toward treatments and procedures, and help them develop positive coping methods [16]. Not only do hands-on interventions benefit the

developing child in that specific visit, but they can also benefit them during any other future interactions they have with healthcare [16].

Parental Guardian Involvement

Healthcare professionals are responsible for a large majority of the reduction of fear and anxiety during painful procedures; however, parental guardians also can play a role and contribute to the overall wellbeing of the child. When the parental guardian is active and present in their child's care, the child's physical and psychological needs are often met [17]. The parent guardian of the patient should prioritize providing a peaceful environment during procedures. The parent guardian should also promote good communication between themselves, the healthcare professionals, and the patient. When the parent guardian achieves these standards, they are helping to facilitate lower anxiety and create a positive relationship of trust with healthcare professionals [18].

One way that parental guardians can be involved in their children's care is by implementing various interventions before, during, and after the care is provided. The use of Eutectic Mixture of Local Anesthetic (EMLA) cream requires parental guardian participation through purchasing the cream and putting it on the patient before their appointment. EMLA cream is often used in patients undergoing superficial surgical procedures and IV insertion. It is primarily utilized in pediatric patients for any needle-procedures [18]. Another way that a parental guardian can be involved in their child's care is by a device that vibrates and contains an ice pack to block pain transmission. The parent guardian can hold the device above the venipuncture site, reducing the patient's pain [18].

Another way that parental guardians can be involved in their child's care is through comfort holds. Comfort holding allows the pediatric patient to be distracted from the procedure by their parent guardian holding them, creating a pleasant environment. Comfort holds also prove to be effective while using another form of distraction in conjunction with the hold. Often, parent guardians will hold their child while they watch a movie. The healthcare provider works with the parent guardian to perform the procedure while the patient is distracted [17]. When healthcare professionals reduce the child's anxiety, utilize distraction techniques, and involve the parental

guardians, they are providing therapeutic elements necessary for the pediatric patient in preventing traumatic experiences.

Other Techniques

Pain associated with immunizations can result in distress and anxiety for children and parents [2]. Needle phobia is one of the most common fears among children [19]. The use of cooling techniques reduces pain associated with vaccinations in adults [20]. Pediatric studies show mixed results for vapocoolants and an inability for ice to decrease vaccine-injection pain [2]. Parents of children who received music therapy reported that their child's level of distress was less than during previous medical experiences [21]. Cheng and Perrett [22] found that for pediatric patients for whom standard immunization procedures have failed, distraction techniques and conscious sedation enable immunizations to be given safely and effectively. Other agents used for sedation include inhaled nitrous oxide, midazolam, local anesthetic cream, or play therapy [22].

Chad *et al.* [19] reported it is essential to allow children the opportunity to develop a distraction plan during preparation for any medical procedure. A headset as a fear reduction and pain distraction during immunizations has been successful [19]. As shown in Figure 5 passive and active distractions as interventions for pain management are common in hospitals [23]. In passive distraction, the patient does not participate in the process of distraction; however, in the active distraction, the patient participates actively [23].

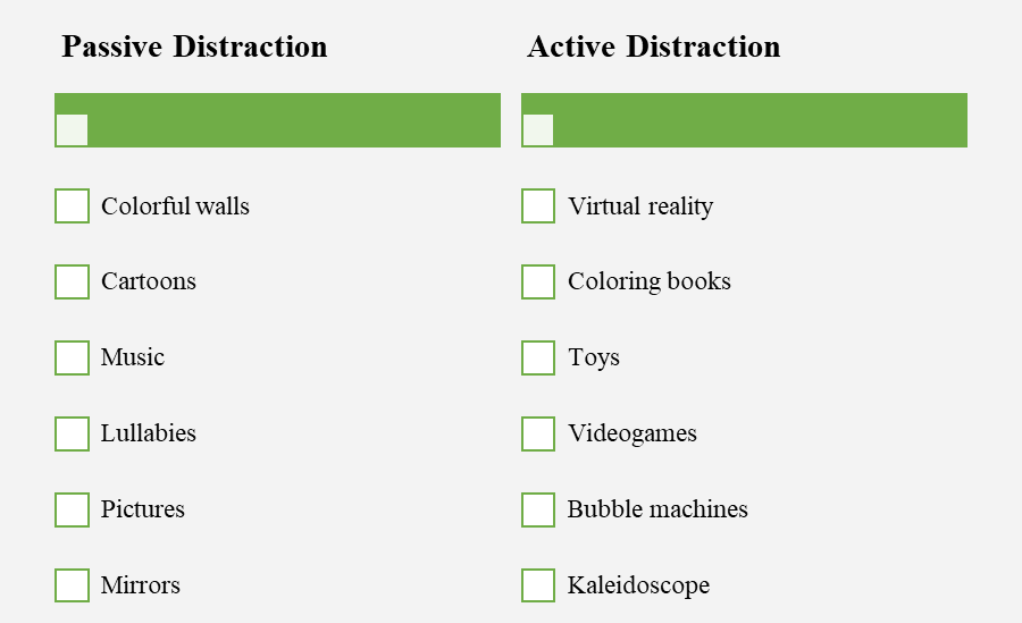

Figure No. 5: Passive and active distractions as interventions for pain management

Russell and Harrison [24] suggested promoting breastfeeding during immunizations, not just afterward for comfort. Small volumes of sweet sucrose solutions are recommended for infants. Topical anesthetics should be available to families, especially for fearful children. Some of these are available over the counter. Age-appropriate distraction techniques such as counting for older children, bubbles for younger children, and rewards for all ages including iPads and mobile phones also seem to help distract children. A vibration device can be used for children older than four. Above all, healthcare practices should consider instituting a pain management policy for immunization [24].

Summary of Findings

Various research studies and findings were used for the examination of distraction techniques and their impact on pain in pediatric patients. The purpose of this review was to understand different distraction techniques that may improve pain perception, including virtual reality, visual distractions, hands-on distractions, and parental guardian involvement (see Figure 6). About the PICO question, it was found that various distraction techniques during immunization administration in young children result in lower pain scores compared to no interventions.

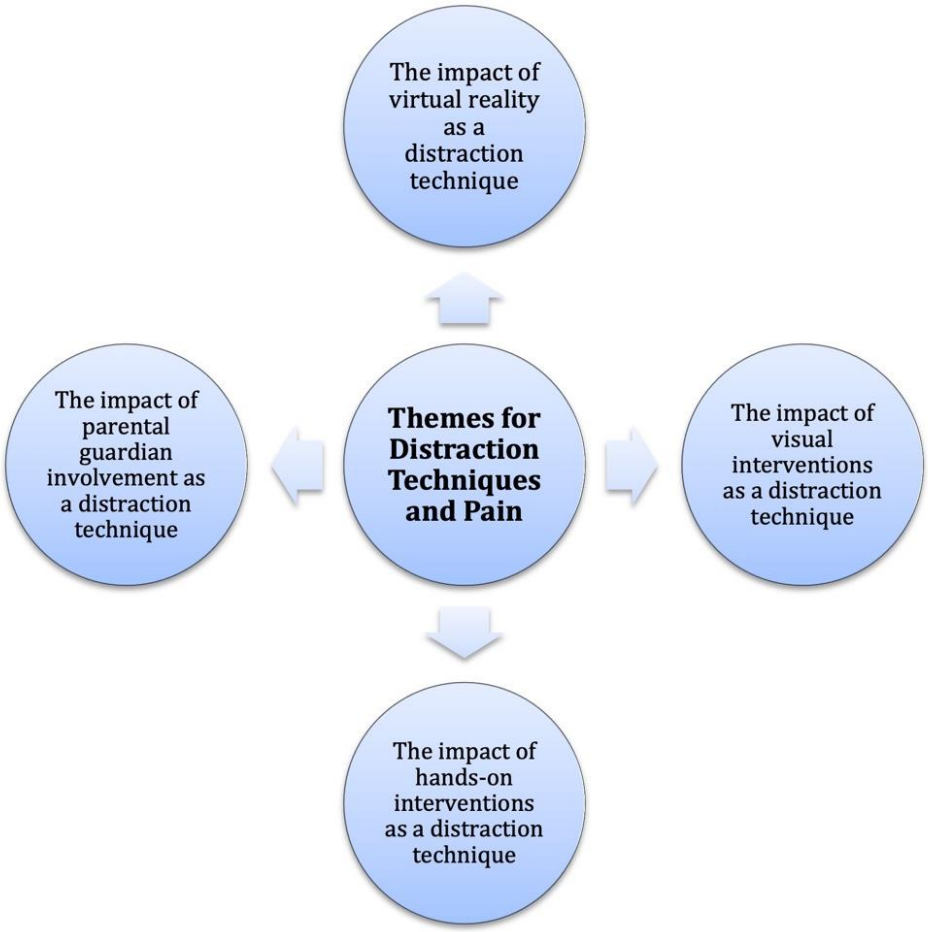

Figure No. 6*:* Findings on distraction techniques and their impact on pain in pediatric patients

DISCUSSION

With all the resources used to facilitate discussion about distraction techniques in medical procedures, it can be understood that the importance of this strategy can immensely impact the pediatric patient population. Distraction techniques have identified their importance in the decrease of pain and anxiety in patients undergoing painful procedures [5]. The education of healthcare professionals regarding distraction methods and how to implement them can result in decreased anxiety and pain for the patient [17]. This promotes a healthy interaction where the patient can maintain decreased levels of stress. In comparison, when a patient does not have the intervention of distraction, there is an obvious shift in the increase of anxiety and fear that is not beneficial to the patient's physical or psychological health [5]. Distraction techniques should be a

common practice within all health care agencies to facilitate the best possible outcome for all pediatric patients.

There were various strengths while researching this review. One of the strengths of this review was the number of studies that were available regarding distraction techniques related to medical procedures. Much of the research found was current and included many relevant studies concerning techniques that can be used today in medicine, versus five or ten years ago. Various types of research were used, including current practices guidelines, randomized controlled trials, systematic reviews, and meta-analysis. With the amount and variety of research found, there were many aspects concerning distraction techniques in pediatric patients that we were able to use in this review. One recommendation would be to continue research regarding distraction techniques and coping mechanisms among pediatric patients. Research should also examine barriers to utilizing distraction methods, such as anxiety, parent involvement, and knowledge of health care workers.

CONCLUSION

Throughout someone's life, they are most likely to have some type of painful medical procedure. Children who experience difficult medical procedures may cause stress, anxiety, or pain. Therefore, something to ease the pediatric patient's overall experience in the health care setting may create a positive environment, leading to more positive outcomes. Distraction helps to control and soothe their pain with nonpharmacological techniques, which maximize their response to painful, and potentially traumatic, procedures. Certain distraction techniques include virtual reality, visual interventions, hands-on interventions, and parental involvement. Using these distraction techniques, either in combination or alone, creates an environment that is trusting and provides growth opportunities. Studies have shown that using diversion approaches will optimize the patient's growth, which can powerfully and positively impact their perception of pain that they will carry with them for the rest of their lives.

REFERENCES

1. Wodi, A. P., Ault, K., Hunter, P., McNally, V., Szilagyi, P. G., & Bernstein, H. (2021). Advisory committee on immunization practices recommended immunization schedule for children and adolescents aged 18 years or younger

- United States, 2021. *MMWR: Morbidity & Mortality Weekly Report*, *70*(6), 189–192. https://doi.org/10.15585/mmwr.mm7006a1.

2. Jenkins, N., Orsini, F., Elia, S., & Perrett, K. (2021). Minimising Immunisation Pain of childhood vaccines: The MIP pilot study. *Journal of Paediatrics and Child Health*, *57*(3), 376–382. https://doi.org/10.1111/jpc.15229.

3. Lee, H. N., Bae, W., Park, J. W., Jung, J. Y., Hwang, S., Kim, D. K., & Kwak, Y. H. (2021). Virtual reality environment using a dome screen for procedural pain in young children during intravenous placement: A pilot randomized controlled trial. *PLoS ONE*, *16*(8), 1–11. https://doi.org/10.1371/journal.pone.0256489.

4. Easterlin, M. C., Berdahl, C. T., Rabizadeh, S., Spiegel, B., Agoratus, L., Hoover, C., & Dudovitz, R. (2020). Child and parent perspectives on the acceptability of virtual reality to mitigate medical trauma in an infusion center. *Maternal & Child Health Journal*, *24*(8), 986–997. https://doi.org/10.1007/s10995-020-02955-x.

5. Tumakaka, G. Y. S., Nurhaeni, N., & Wanda, D. (2020). Squeezing a squishy object effectively controls pain in children during intravenous catheter insertion. *Pediatric Reports*, *12*, 8 10. doi: 10.4081/pr.2020.8692.

6. Cho, M. K., & Choi, M. Y. (2021). Effect of distraction intervention for needle-related pain and distress in children: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, *18*(17), 9159. doi:10.3390/ijerph18179159.

7. Longobardi, C., Prino, L. E., Fabris, M. A., & Settanni, M. (2018). Soap bubbles as a distraction technique in the management of pain, anxiety, and fear in children at the paediatric emergency room: A pilot study. *Child: Care, Health & Development*, *45*(2), 300–305. https://doi.org/10.1111/cch.12633.

8. Ellerton, K., Tharmarajah, H., Medres, R., Brown, L., Ringelblum, D., Vogel, K., Dolphin, A., Craig, S. (2020). The VRIMM study: Virtual reality for immunization pain in young children-protocol for a randomised controlled trial. *BMJ Open*, *10*(8), e038354. https://doi.org/10.1136/bmjopen-2020-038354.

9. Nagarajan, A. A., Radhakrishnan, V., & Ganesharajah, S. (2019). Radiotherapy in children without anesthesia: A feasibility approach using distraction. *Indian Journal of Medical & Paediatric Oncology*, *40*(4), 507–509. https://doi.org/10.4103/ijmpo.ijmpo_120_18.

10. Nunns, M., Mayhew, D., Ford, T., Rogers, M., Curle, C., Logan, S., & Moore, D. (2018). Effectiveness of nonpharmacological interventions to reduce procedural anxiety in children and adolescents undergoing treatment for cancer: A systematic review and meta-analysis. *Psycho-Oncology*, *27*(8), 1889–1899. https://doi.org/10.1002/pon.4749.

11. Schmidt, N. A., & Brown, J. M. (2019). *Evidence-based practice for nurses: Appraisal and application of research*. Jones & Bartlett Learning.

12. Piskorz, J. E., Czub, M., Šulžickaja, B., & Kiliś-Pstrusińska, K. (2020). Mobile virtual reality distraction reduces needle pain and stress in children? *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *14*(1).

13. Arane, K., Behboudi, A., & Goldman, R. D. (2017). Virtual reality for pain and anxiety management in children. *Canadian Family Physician Medecin de Famille Canadien*, *63*(12), 932–934.

14. McCollum, B. J., Conner, S. J., Scott Earwood, J., McCollum, B., & Earwood, J. S. (2021). No pain if you've got game. *Journal of Family Practice*, *70*(1), E1–E3. https://doi.org/10.12788/jfp.0132.

15. Cerne, D., Sannino, L., & Petean, M. (2015). A randomised controlled trial examining the effectiveness of cartoons as a distraction technique. *Nursing Children and Young People*, *27*(3), 28–33. https://doi.org/10.7748/ncyp.27.3.28.e534.

16. Kapkın, G., Manav, G., & Muslu, G. K. (2020). Effect of therapeutic play methods on hospitalized children in Turkey: A systematic review. *Erciyes Medical Journal / Erciyes Tip Dergisi*, *42*(2), 127–131. https://doi.org/10.14744/etd.2019.94940.

17. Stevens, K. E., & Marvicsin, D. J. (2016). Evidence-based recommendations for reducing pediatric distress during vaccination. *Pediatric Nursing*, *42*(6), 267-275. http://www.pediatricnursing.net/ce/2018/article4206267274.pdf

18. Balanyuk, I., Ledonne, G., Provenzano, M., Bianco, R., Meroni, C., Ferri, P., & Bonetti, L. (2018). Distraction technique for pain reduction in peripheral venous catheterization: Randomized, controlled trial. *Acta bio-medica: Atenei Parmensis*, *89*(4-S), 55–63. https://doi.org/10.23750/abm.v89i4-S.7115.

19. Chad, R., Emaan, S., & Jillian, O. (2018). Effect of virtual reality headset for pediatric fear and pain distraction during immunization. *Pain Management (London)*, *8*(3), 175–179. https://doi.org/10.2217/pmt-2017-0040.
20. Hall, L. M., Ediriweera, Y., Banks, J., Nambiar, A., & Heal, C. (2020). Cooling to reduce the pain associated with vaccination: A systematic review. *Vaccine*, *38*(51), 8082–8089. https://doi.org/10.1016/j.vaccine.2020.11.005.
21. Yinger, O. S. (2016). Music Therapy as Procedural Support for Young Children Undergoing Immunizations: A Randomized Controlled Study. *The Journal of Music Therapy*, *53*(4), 336–363. https://doi.org/10.1093/jmt/thw010.
22. Cheng, E. S., & Perrett, K. P. (2018). Immunizations under sedation at a pediatric hospital in Melbourne, Australia from 2012–2016. *Vaccine*, *36*(25), 3681–3685. https://doi.org/10.1016/j.vaccine.2018.05.018.
23. Pancekauskaitė, G., & Jankauskaitė, L. (2018). Pediatric pain medicine: Pain differences, recognition and coping acute procedural pain in the pediatric emergency room. *Medicina (Kaunas, Lithuania)*, *54*(6), 94. https://doi.org/10.3390/medicina54060094.
24. Russell, K., & Harrison, D. (2015). Managing pain in early childhood immunization. *Nursing New Zealand (Wellington, N. Z.: 1995)*, *21*(2), 22–24.

	**Katie E. Gerndt** *Bethel University School of Nursing, Mishawaka, Indiana, USA*
	**Rebecca L. Luzney** *Bethel University School of Nursing, Mishawaka, Indiana, USA*
	**Christina A. Moyer** *Bethel University School of Nursing, Mishawaka, Indiana, USA*
	**Dr. Samuel P. Abraham– *Corresponding Author*** *Associate Professor of Nursing, Bethel University, 1001 Bethel Circle, Mishawaka, Indiana, USA*