

The Use of Distraction Techniques During Injection in Pediatric Patients

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Having a medical procedure done, particularly when needles are involved, is a common source of stress and pain in the pediatric population. Unrecognized or unmanaged pain can result in negative consequences including physiological, psychological, and emotional (Ballad et al., 2018). The perception of pain is unique to everyone, and adults can foresee what type of procedure might cause pain and justify why it was needed in case it may need to happen again, such as an intravenous puncture for a blood draw. On the other hand, pediatric patients do not have the ability to differentiate between temporary pain which can have lasting negative effects on the child, including increased anxiety with medical professionals and diagnostic tests (Hoefner-Notz, 2018).

Pediatric patients can experience pain with injection more frequently than other invasive measures, as it is a common method of administration for immunizations (Dabas, 2019). As children are exposed to injections through vaccinations or venipuncture, pain associated with the needle procedure is seen commonly (Khanjari, 2021). Treating pain in infants might be one of the hardest situations for clinicians due to the lack of ability to communicate effectively and the inability to explain in any notion what the clinician is about to perform on the child to the child themselves. Thane et al. (2016) recognized that untreated pain in infants and young children may lead to an increased perception of pain. This increased perception of pain can lead to issues with chronic pain in adolescents and adults. This statement lends to the fact that young children, even infants, can form deep memories of events that can alter their perception of pain, lasting well into adulthood if not managed appropriately. The less amount of pain we can inflict on a child, the less likely they are to form these memories (Ballard et al., 2018).

The current standard of care for pain varies from pharmacologic interventions including topical analgesics such as lidocaine, nonpharmacologic methods of distraction, and no intervention. Although there is an increase in the use and development of pharmacological and non-pharmacological interventions, pain management remains negligible. Current pharmacological methods include numbing agents, topical or subcutaneous lidocaine (Hsu, 2020). The drawbacks to pharmacological interventions are the potential side effects and the time for analgesic effect. No intervention potentially increases anxiety and the pain the child experiences (Bergomi, 2018).

Alternatively, Ballard (2019) suggests that current evidence on distraction techniques is not being translated in clinical practice or that the proven interventions are being underused by healthcare providers. Distraction techniques are a non-pharmacological method to decrease the perception of pain. Distraction can lead to less pain felt by the child, therefore decreasing the child's anxiety of the invasive procedure in the future (Inan & Inal, 2019).

Many different types of distraction techniques have been researched with a positive outcome. According to the Center for Disease Control and Prevention [CDC] (2019) suggests distracting the child with clinician lead distraction techniques such as age-appropriate storytelling, comforting holds, toys, and pointing out things in the room. It is important to keep in mind the client's age, developmental level, and interests to find the distraction technique that is tailored to the most effective results (Inan & Inal, 2019).

The concern with the current standard of care is that providers are not proactive regarding pain and anxiety caused by a simple invasive procedure, such as an injection (Ballard, 2019). Continuous pain leads to learned aversion techniques, undue stress on the child, increased anxiety, and more difficulties breaking these learned cycles (Bergomi, 2018).

Problem Statement

Management of pain and anxiety in children can be challenging due to many factors such as age, developmental stage, and the ability to understand what pain is and verbalize that to someone (Inan & Inal, 2019). Even with the challenges pain reporting can pose, pain relief is a right of all patients, including children (Hoefner-Notz, 2018). Using distraction techniques can improve the standard of care by reducing the pain and anxiety felt by children during venipuncture or injection.

Individuals perceive pain differently, and pediatric clients are no different. Pain management in the pediatric population can be extremely challenging to assess as a clinician. Each child has a personal pain response and, due to age or development, may not be able to accurately verbalize to the provider the specifics about their pain (Inan & Inal, 2019). Distraction can be an evidence-based technique to minimize a child's pain response to an invasive procedure such as immunization or venipuncture (Dabas, 2019). A distraction or a change of focus onto something during the procedure helps with the child patient's pain and distress (Longobardi et al., 2019). The aim of this paper is to identify the current evidence-based research showing positive, statistically relevant evidence for the intervention of using distraction techniques to reduce pain in children during venipuncture and immunization.

PICO question

In children under 12 years old, do distraction techniques during injections result in lower pain scores when compared to not using distraction techniques?

Background and Significance

For chronically and acutely ill children, pain and anxiety relief should be a priority. If not handled correctly, children can develop a negative connotation between healthcare facilities and clinicians. This leads to increased anxiety and an increased perception of pain. Pain and anxiety management with children is essential because it may modify children's memory for pain and the subsequent interactions with clinicians having to perform painful interventions such as immunization injections (Ronfani, 2016). Pain can leave an everlasting impression and cause the child to create an aversion to the painful act in the future. This can make it much harder to treat or diagnose the child in the future and can make the future use of nonpharmacologic techniques increasingly challenging (Thrane, 2016). The use of parental reporting of the child's pain is one way to help mitigate this discrepancy in pain reporting and assessment (Inan & Inal, 2019). While distraction techniques are well studied and have shown positive outcomes, there isn't much integration utilization on the age of the child, what distraction techniques work best, and if the techniques used by primary care staff are tailored to the child's uniqueness (Ballard et al., 2018; Inan & Inal, 2019).

Distraction offers an opportunity to help manage pain during an invasive procedure. There are six main distraction techniques discussed in the literature. Simple toys, video games, virtual reality, comfort holding like swaddling, animated cartoons, and cutaneous stimulation with a device named "Buzzy" (Ballard et al., 2019; Bergomi et al., 2018; Dabas, 2019; Inan & Inal, 2019). Simple toys and swaddling are used mostly for infants (Dabas, 2019). Light-up toys, "Buzzy," animated cartoons, and comfort holding are mostly used in the toddler and young child group, ages 18mos – 4 years (Ballard et al., 2019; Dabas, 2019). Animated cartoons, virtual reality, video games, and "Buzzy" are mostly used in the 6-year-old to 12-year-old age groups (Ballard et al., 2019; Bergomi et al., 2018).

Currently, there are three pain scales available to measure pain in the pediatric population. These pain scales include FLACC, FACES, and the Numerical Rating Scale (NRS) 1-10 pain scales. The American Physical Therapy Association [APTP] (2017) defines the FLACC pain scale as a tool to be used for young children not able to verbalize pain or self-report. Pain is assessed by observing the patient in five categories. Face, legs, activity, crying, and the ability to be consoled. The Wong-Baker FACES scale is used with children able to understand how to use the self-assessment tool, usually above the age of 3 years old (Wong-Baker, 2020). Children select which “face” describes their level of pain. A happy face represents no pain and a crying face represents severe pain. The NRS is a self-reporting pain scale where 0 indicates no pain and 10 is the worst pain experienced (Haefeli & Elfering, 2006).

Evidentiary Support for the Use of Distraction Techniques during Immunization

There is a distraction device that is being used in clinical trials named “Buzzy” (Ballard et al., 2019; Bergomi et al., 2018; Ronfani, 2016). This device combines distraction and physical analgesia through vibration and a cooling sensation. A study conducted by Ballard et al. (2019) found a statistically significant decrease in pain and anxiety when using “Buzzy” alongside animated cartoons ($p < .02$). This study was a random controlled noninferiority controlled trial evaluating children during venipuncture or intravenous insertion. Bergomi et al. (2018) also conducted a study using “Buzzy” where they evaluated children in a randomized controlled trial undergoing venipuncture in the outpatient setting. This study found that distraction with “Buzzy” was significantly effective for children younger than 9.

Ronfani (2016) compared “Buzzy” with handheld computer devices in a randomized controlled trial in children from 4-12 years of age to assess pain relief during venipunctures. The

pain was lessened for children ages 4-7 using the faces scale as well as in older children ages 8-12 using the NRS scale. Statistical significance was reported in the difference in pain using the distraction techniques. The study conclusion supported the use of distraction techniques, The author additionally found that there was no significant difference between the two distractive devices.

In the Inan, G. & Inal, S. (2019) randomized controlled trial compared four separate distraction techniques for older children aged 6 years to 10 years. Participants were randomized into 4 groups, cartoon movies, video games, and parents' verbal interaction whereas no distraction method was used on the last group of children. The authors reported a statistically significant reduction in the level of anxiety and pain perceived while playing video games, ($p < .05$), evaluated using the Wong-Baker FACES pain scale. The authors concluded the lowest level of anxiety and pain perception was reported in the video game group. The scores observed both in the cartoon group and the parental intervention group were significantly lower than in the control group ($p < .05$).

In a random controlled trial Dabas (2019) looked at infants using toys as a distraction during immunization. Dabas used a true experimental multiple intervention post-test control design. There were 100 infants selected using a simple random sampling technique and were randomly allocated in various groups by the lottery method. The groups were an electronic toy group, key toy group, simple toy group, and control group. During immunization, distraction techniques were shown to experimental groups and routine care was given to the control group. Reliability was calculated by the Kappa method and it was 0.83 of FLACC pain scale to assess pain intensity during immunization among infants. Dabas concluded that the difference between the mean pain score of infants in the electronic toy group, key toy group, simple toy group with

control group was found to be statistically significant at ($p < 0.01$) level of significance. Based on the study findings, it is concluded that distraction techniques were effective in reducing the pain intensity during immunization among infants.

From the studies discussed there is positive evidence showing distraction techniques may improve perceived pain and distress in children using the appropriate pain scale in reporting. Of note, no single device or technique is better than another for acute distraction, yet each child might benefit from a customized experience based on personal preferences and developmental level (Ballard et al., 2019).

Barriers to Intervention Implementation

Ballard et al. (2019) state that most methods currently used for the relief of procedural pain and anxiety for children require time or extra staff, which represent barriers to their implantation. Another barrier includes the inability to quickly understand the interests of the child to customize which distraction technique would help the child. Uniform distraction techniques will not work on every single child due to human individuality. As clinicians, it is important to get to know our patients and tailor care based on their developmental level and their personal interests.

Utilizing theories to explain behaviors can benefit the patient and the provider by providing the best evidence-based support to ensure a smooth and confident interaction between the two parties, potentially resulting in less distress to the child client (Trottier et al., 2019). Kathryn Barnard was a nurse theorist who developed the child health assessment theory, based on some of the barriers she had seen through her care of the pediatric population (Pokorny, 2014).

Introduction of Theory

A healthy relationship between the child patient and the provider is necessary for an ongoing healthy relationship for the next 18 years. When the child undergoes numerous painful procedures, specifically in this case, injections, the child can develop a negative perception of the healthcare provider. (Trottier, 2019). Those negative perceptions can show themselves through the child patient as behavioral issues. Kathryn E. Barnard developed the child health assessment theory, which sees a child's behavior as a product of three things (Nursology, 2019). The child, the caregiver, and the environment. Advanced practice providers can use adaptive methods to modify any of the three characteristics of the theory to compensate for the needs of the system. Manipulating the environment to be quieter, can help the child and caregiver stay calm (Nursology, 2019). Providing the child with a distraction, and the caregiver education on how to use said distraction can help the child not perceive pain as strongly during an injection.

Barnard's Child Health Assessment Interaction Theory

The interaction of caregiver, environment, and child, which emphasizes children's growth and development as well as mother-infant bonding, is one of the major ideas of Barnard's child health assessment interaction theory (Nursology, 2019). The parent-infant system is influenced by the unique attributes of each member, and adaptive behavior modifies those traits to suit the needs of the system. Barnard proposed that individual characteristics of members influence the parent-infant system, and adaptive behavior modifies those characteristics to meet the needs of the system (Pokorny, 2014). Her theory borrows from psychology and human development and focuses on mother-infant interaction with the environment. While initially, Dr. Barnard's theory was population specific to infants and caregivers in the first year of life, it is now applicable to the first three years of life (Pokorny, 2014). Barnard's theory may improve the care of pediatric clients and their families when applied to the patient care setting.

Theory's Influence on the Advanced Practice of Nursing

Barnard's influence on the advanced practice of nursing is in how practitioners comprehend the child's development and how the practitioner can intervene with the caregiver and the environment to maximize the child's health. Barnard's theory explains how children and infants comprehend auditory, visual, and tactile stimuli which has improved how advanced practitioners care for this group of patients (Mental Health Hub, 2022). One way Barnard's theory has influenced the advanced practice of nursing is by promoting the health of the caregiver and child relationship and encouraging positive familial interactions (Mental Health Hub, 2022). Barnard found this relationship a necessity in how the pediatric patient responds to medical treatment (Nursology, 2019). Barnard emphasizes that a successful parent-child relationship is a way of preventative health care in itself and can prevent behavioral issues with medical treatments as the child grows older (Nursology, 2019)

The environment is The Child Health Assessment Theory's third component. Barnard's theory addresses that changing the environment surrounding the child can influence not only behavior but also healing. This discovery influences advanced practice nursing by allowing the practitioner or parent to provide environmental change to benefit the pediatric patient. An example depicted in Barnard's theory is rocking infants in rocking chairs. There was a positive correlation between rocking infants in the hospital nursery Barnard worked at and the infant gaining weight. Dr. Barnard's dissertation led her to become interested in how an incubator could support a baby's development of more mature sleep patterns by replicating heartbeat and rocking. She created a rocking bed and discovered that rocking helped babies gain weight and develop better motor and sensory skills (Pokorny, 2010). Parents and other caregivers are now encouraged to rock the newborn infants in the rocking chairs that are now a staple in hospitals

and neonatal critical care units. One of Barnard's finest individual contributions to the field of child development was her success with early intervention.

Another contribution of Barnard's research to advanced practice nursing is the foundation for Nursing Child Assessment Satellite Training, which produces and develops research-based products, assessments, and training programs to teach professionals, parents, and other caregivers the skills to provide nurturing environments for young children. Barnard's theory provides a foundation for advanced practice nurse practitioners to promote healthy patient environments and education which is why this theory was chosen to be the framework for this quality improvement project (Mental Health Hub, 2022).

Theoretical Framework Analysis

In pediatric populations, does the use of distraction techniques during injections lessen negative responses? In Barnard's child health assessment interaction theory, young pediatric patients are at the center of discussion alongside the caregiver of the child and the child's environment. The theory's three parts act as a percentage or a Venn diagram type of model where one-third might be faltering, the other two-thirds should pick up. The adaptive behavior of the child, the caregiver, and the environment will allow for the needs of the system to be met (Pokorny, 2010). This theory works best with subjective observation and measurement of the child's outcome. Barnard's child health assessment interaction theory addresses the ideology that children are not one size fits all and outside objects such as caregivers and environments, can alter how the child perceives said medical procedure. In this case, injections such as immunizations or medication administration. Applying this theory to pediatric patients in the inpatient setting would allow for an integrated system between the patient, the caregiver, and the environment and altering any of the three to provide the least amount of negative feedback.

Theoretical Contribution to APRN Profession

According to Letourneau et al. (2011), a study of the protective effect of maternal behaviors on infant development supported relationship-focused interventions in families with infants with mothers with maternal depression. The studies found a relationship between infant development, fragmented sleep patterns, and cortisol development. The application of Barnard's child health assessment model into practice in a primary care setting would support that there is a link between postpartum depression with adverse child development outcomes (Letourneau et al., 2011). Applications of this in a primary care setting would be the need for psycho-social postpartum depression scales for immediate intervention to prevent adverse outcomes of infant development. Utilization of scales for predictors, such as the Edinburgh Postnatal Depression Scale for screening is considered a valid, yet easy scale to administer in the primary care setting (Barassi & Grelash, 2022). This would be a specific example of how the implementation of evidence-based postpartum depression scales as a standard of care by APRNs in family practice supports the use of Barnard's child health assessment model. Utilizing these tools allows advanced practice nurses to apply an evidence-based approach to our pediatric populations' care, which allows for safer interactions between provider and patient.

Theory Implication to Guide Personal APRN Practice

Children can have greater difficulty in understanding, accurately expressing, or overcoming the distress and pain they experience during the treatment process. Even a minimal medical procedure can arouse meaningful pain and distress among some children (Cho & Choi, 2021). Injections can induce anxiety, fear, or negative emotions, and distress in the child and caregiver. Children can remember past painful experiences, and the negative memory of pain or fear caused by poor management during treatment can affect the subsequent treatment, consequently having an adverse long-term impact on future responses to pain (Cho & Choi, 2021)

Utilizing Barnard's child health assessment theory, the nurse practitioner can make changes to the child's environment, educate the caregiver on distraction techniques to help the caregiver stay strong or calm in the face of a distressing event, or even provide the child with positive connotations to the negative experience.

Literature Search

Pediatric patients are subject to pain and distress with procedures, especially those containing needles. This pain and distress can be diminished if not eradicated through the effective use of distraction techniques tailored to the child. This literature search was conducted to evaluate the effects of distraction techniques for pain relief during pediatric injections. The following databases were used: Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and MEDLINE (PubMed). The following search terms: "distraction techniques AND pediatrics" yielded 451 results. The age of the reports was adjusted to include all reports from 2016 to 2013 which narrowed down the results to 257. Additional search terms of "injection" or "immunization" were added, narrowing the results to 20 applicable articles. The search was narrowed down to studies that utilized distraction techniques for pain management during immunizations, and or injections for the pediatric population. Only peer-reviewed, current studies within the last seven years were included. The final search resulted in five total studies. Three of the studies were randomized controlled trial studies (Bergomi et al., 2018; Inan, G. & Inal, S., 2019; Khanjari et al., 2021), one study was a parallel trial design (Longobardi et al., 2019), and the last article was a randomized controlled noninferiority trial with two parallel groups (Ballard et al., 2019).

Literature Review

In the literature found, several themes emerged that are important in supporting this capstone project PICO question that related to the utilization of distraction techniques reducing pain for pediatric injections. One important theme is the comparison of the different distraction techniques studies vs. no distraction offered. Another theme is the outcome potential for distraction techniques to reduce pain and adverse reactions in the pediatric population while receiving injections. The last theme that will be reviewed is the different types of distraction tools utilized. These include vibration, cold, age-appropriate toys, breastfeeding, video games, and bubbles. These themes are significant because they have the potential to impact the standard process of giving pediatric injections such as immunizations. The benefit of changing the standard is reducing adverse emotional effects and pain in the pediatric population. These themes can provide valuable insights into the most effective interventions for utilizing distraction techniques in children.

Distraction Techniques

In all five studies, some type of distraction, tool, or technique was implemented for the study group, and the control group implemented no distraction technique or a different distraction technique that they were comparing (Ballard et al., 2019; Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Khanjari et al., 2021., Longobardi et al., 2019). Combined, the five articles studied a total of 855 children under the age of 18, with the majority age between 6-10 years of age.

Bergomi et al. (2018) and Khanjari et al. (2021), included the Buzzy device as one of the distraction techniques. The children were separated into experimental, placebo, and control groups. The two studies differ with their groups and inclusion of distraction techniques. Both studies included an experimental group that included external cold and utilization of the Buzzy

device. Khanjari et al. (2021) included a placebo group with the Buzzy device while it was turned off and without the additional external cold stimulation and a control group that included no interventions. Simultaneous external cold and vibration (with Buzzy device on or off) were used in the experimental and placebo groups, respectively. With Bergomi et al. (2018), the authors included an animated cartoon group and a combination group in addition with the control Buzzy group. Both authors found evidence that pain during immunization in the experimental groups were significantly lower than in the placebo and control groups.

Inan, G. & Inal, S. (2019) studied 180 children aged 6 to 10 years of age receiving venipuncture. The authors separated the participants randomly into 4 groups. The children in Group 1 watched cartoon movies, the children in Group 2 played video games, and the children in Group 3 were distracted by their parents' verbal interactions, whereas no distraction method was used on the children in Group 4. Alternatively, Longobardi et al. (2019) used soap bubbles as a distraction technique in the reduction of fear and the perception of pain in children awaiting a medical examination at the pediatric emergency room. They studied 74 children between the ages of 7 to 10 years old. The authors of each study showed evidence that the children in the experimental groups showed a significant reduction in perceived pain and a significant reduction in fear whereas there was no difference in the control group.

The authors of the studies discussed the study designs in a positive manner. All of the study designs implemented showed a reduction in pediatric pain when compared to the control group. Bergomi et al. (2018) reported the main finding that non-pharmacological distraction methods offered pain control and decrease anxiety in children and-parents as compared to the standard procedure, which is no intervention.

Pain Relief with Distraction

Four out of the five studies reported statistically positive outcomes with respect to implementing some type of distraction technique for children receiving injections (Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Khanjari et al., 2021; Longobardi et al., 2019). Ballard et al., (2019), talked about how the data was going to be analyzed using statistically significant p - values but did not talk about confidence interval or how the statistics were resulted.

Inan, G., & Inal, S. (2019), showed evidence that the difference between distraction techniques reducing pain and anxiety was statistically significant ($p < .05$) vs. the control group with no distraction techniques. This study utilized multiple different distraction methods and found the pain scores observed in all the distraction groups were significantly lower than in the control group ($p < .05$). They additionally reported that the difference between the groups based on both the anxiety levels and pain scores during venipuncture was also statistically significant ($p < .05$).

Bergomi et al., (2018) a statistically significant difference in the animated cartoon group ($p = .02$) for children's perception of pain; as well as reported the secondary analysis that the Buzzy® was highly effective in children younger than nine ($p = .04$). Also, significant efficacy was recorded in the Buzzy® and Cartoon group ($p = .04$) for the nurse's perception of the child's pain, and in the Buzzy® group for the mother's perception of the child's pain ($p = .002$).

Additionally, Khanjari et al. (2021) found that pain during immunization in the experimental group (3.71 ± 1.61) was significantly lower than the placebo (5.25 ± 1.37) and control groups (4.45 ± 4.45). The difference between before and after anxiety levels was not significant in the three study groups ($p < .001$). Lombardi et al. (2018) reported with respect to pain, the ANCOVA indicated the presence of significant intervention effects on self-reported

pain utilizing the visual analog scale (VAS score) at the time before the medical visit, $F(1,74) = 4.45, P = .04, \eta^2 = .06$.

Lombardi et al. (2018) was the one study which did or did not show a significant difference in the VAS score between the experimental and control groups after the medical visit (Lombardi et al., 2018). Following the interventions, using soap bubbles as a distraction method, led to a higher decline in pain in the intervention group at the time before the medical visit than in the control group. VAS mean scores at the time after the medical visit did not present differences between the two groups.

The studies that offered statistically significant pain reduction scores used soap bubbles, Buzzy device, cartoons, and video games for their distraction techniques (Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Longobardi et al., 2019; Khanjari et al., 2021). Ballard et al., (2018) did not offer completed statistical analyses for the public and they used the distraction method Buzzy solely.

The reviewed studies offered mostly positive results of their data analysis. In addition to reporting statistical significance, confidence intervals were included in two studies (Longobardi et al., 2019 & Ballard et al., 2019) whereas they were not included for any other of the included studies (Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Khanjari et al., 2021) Overall, the concluding evidence based on the literature, is that any sort of distraction technique in general compared to no distraction technique can decrease the perception of pain in the pediatric population during injections. None of the studies offered power analyses. These are important to make sure sample size is adequate and a power analysis that is met provides stronger evidence. Some studies discussed how the research could have been improved theoretically such as creating stricter controlled or blinded sides (Bergomi et al., 2018; & Khanjari et al., 202) even

though the study results offered statistically significant data that showed any measures of distraction techniques did decrease pain in the pediatric population.

Pain Assessment Tools

As mentioned previously there were a number of pain scales utilized: Wong-Baker Faces Pain rating scale, Visual Analogue Scale (VAS), the Children's Hospital of Eastern Ontario Pain Scales (CHEOPS), Numerical pain scale, and the Faces Legs Activity Cry Consolability Scale (FLACC). Three of the studies used Wong-Baker Faces Pain rating scale (Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Khanjari et al., 2021). On the other hand, Longobardi et al. (2019) used the Visual Analogue Scale (VAS) which is a horizontal scale that ranges from "no pain at all" (happy face on the extreme left side of the scale) to "the worst pain imaginable" (sad face on the extreme right of the scale). Alternatively, Ballard et al. (2019) used a combination of self-report pain scales: VAS, Wong-Baker Faces, Numerical Rating Scale, (the Children's Hospital of Eastern Ontario Pain Scales (CHEOPS) or the Faces Legs Activity Cry Consolability Scale (FLACC)). This is important to report because Ballard et al. (2019) is one of the only studies that utilized multiple age groups and response levels.

The authors chose the specific pain scales due to their relation in reporting effective acute pain in the pediatric population. None of the studies offered specific reliability or validity information other than stating that the pain scales used were valid. Though there is no mention of a gold standard for pain scales, the selection of the tools used are based on a developmental level of the child. Khanjari et al., (2021) offered a description of the Wong-Baker FACES pain rating scale and explained that this tool was originally created for children to help them communicate about their pain. It can be used for people aged 3 and older and the authors planned for the nurse and patient to use this scale independently. Longobardi et al. (2019), offered discussion of the

Visual Analogue Scale, which uses a horizontal scale that ranges from “no pain at all” (happy face on the extreme left side of the scale) to “the worst pain imaginable” (sad face on the extreme right of the scale) and is meant to be used for children 8 years old and above. There were no other discussions of why the tools selected were chosen.

Limitations and Strengths

Regarding distraction techniques for pain reduction in children, there were a few limitations. Three of the studies were not double-blinded, which may have made it difficult for the employee in charge of administering the intervention to be unbiased. Another limitation could be the use and benefits of the Wong-Baker Faces Pain scale. There has been debate among researchers about its optimum design which would be facial shape and features and the spectrum of pain which would include furrowing of forehead, elevation of eyebrows, mouth opening, etc (Bergomi et al., 2018). The last limitation considered is the number of past medical experiences. This could be considered a further limitation to the studies because the perception of pain may be influenced by past experiences if one child had more injections or immunizations than another.

Strengths of the literature include the reliability of the statistical analysis in all the studies. All five studies showed statistically significant pain reduction with the use of a distraction technique but in three studies there was no other evidence provided for strengthening the evidence such as a confidence interval or power analysis (Bergomi et al., 2018; Inan, G., & Inal, S., 2019; Khanjari et al., 2021). Another strength includes the use of validated grading scales for measuring children's pain levels. The total amount of children studied was a strength as well as the variability of settings that children were seen for intervention. These settings include in the office, in hospital, and in the emergency room.

Gaps in Literature

Currently, the available evidence is limited due to the lack of current research. There were only five relevant studies available in the last seven years. While all the included studies showed a positive pain reduction in the pediatric population, most studies that were included had varying methods of distraction techniques and did not compare distraction techniques equally to each other. The lack of specificity of the selected pain scales and their ability to relieve pain in the pediatric population makes it challenging to determine the best distraction technique for the most effective pain relief. To address these gaps, further research is needed to better understand which specific distraction technique could offer the most pain relief to the pediatric population from the techniques currently included in this literature review.

Conclusion

Having medical procedures that involve using a needle is a common source of stress and pain in the pediatric population. Unrecognized or unmanaged pain can result in negative consequences that include physiological, psychological, and emotional (Ballad et al., 2018). In the literature found, several themes emerged that are important in supporting distraction techniques in reducing pain for pediatric injections. All of the literature reviewed showed that there was positive evidence to support the use of distraction techniques in reducing pain in the pediatric population. Distraction techniques may be a viable option to help decrease pain in the pediatric population with no one technique better than another. Evidence needs to be translated to primary care providers for such techniques to be incorporated into practice. This is a meaningful project to help improve care within the pediatric population where advanced practice nurses can alter the environment, educate the caregivers, and provide a distraction to the child to help mitigate negative associations with injections in the outpatient healthcare setting.

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