

The Effects of Virtual Reality on Needle-Related Pain in Pediatric Oncology Patients

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BACKGROUND & SIGNIFICANCE:

- Needle procedures are the most common cause of pain in US children's hospitals, 4, 16
- Cancer treatment includes many needle-related procedures.
- For pediatric oncology patients, needle procedures are the most painful and stressful element of their treatment. 10, 17
- Most pharmacological methods of pain relief don't address procedural anxiety or stress, key drivers of noncooperation/healthcare avoidance, but distraction does.¹
- Distraction cards, buzzy, music therapy, and video games are commonly used distraction interventions.¹⁵
- A successful distractor is one that stimulates multiple senses, is developmentally- and age-appropriate, and is interactive enough to capture one's full attention.¹⁵
- With VR, the head-mounted display device covers the user's entire visual field, and the headphones replace external auditory sounds with VR simulated sounds.¹⁵
- VR's highly immersive nature is what makes it a particularly powerful and effective method during needle procedures.

PROBLEM/PURPOSE:

To determine if virtual reality (VR) is an effective distraction-based intervention for decreasing pain and anxiety among pediatric oncology patients, during non-sedated needle-related procedures, as compared to standard of care (SOC) pain management techniques.

SEARCH METHODS:

- *Databases:* CINAHL, PubMed
- *Keywords:* pediatric oncology, pain, anxiety, distraction, virtual reality, nurse
- *Inclusion criteria:* Peer-reviewed articles published within the last 7 years, participants aged 6-18 years, written in the English language
- *Exclusion criteria:* Lack of outcome relevance (outcomes other than pain and anxiety), patients/participants undergoing sedated procedures
- *Results:* Seven studies retrieved; five studies selected. Four RCTs and one quasi-experimental study.

NEEDLE-PORT ACCESS:



RESULTS:

- VR can be an effective intervention for reducing pain in pediatric oncology patients undergoing some type of needle-related procedure.
- No serious adverse effects occurred as a result of VR in any of the studies.

EVIDENCE REVIEW TABLE:

AUTHOR (YEAR)	SAMPLE SIZE (N)	RESULTS	LEVEL/ QUALITY RATING
Chan et al., 2018	N = 154	<ul style="list-style-type: none"> • Comparing VR to SOC/control group, pain scores were significantly higher in the control groups • Significant decrease in post-procedure anxiety scores in the VR group 	Level II/Grade A
Gerçeker et al., 2021	N = 42	<ul style="list-style-type: none"> • Comparing VR to SOC/control group, pain scores were significantly higher in the control groups 	Level II/Grade A
Hoag et al., 2022	N = 67	<ul style="list-style-type: none"> • Comparing VR to guided imagery (GI), no significant differences in pain between groups • Significant decrease in post-procedure anxiety scores in the VR group 	Level II/ Grade B
Hundert et al., 2019	N = 40	<ul style="list-style-type: none"> • Comparing VR to SOC/control group, pain scores were significantly higher in the control groups • Significant decrease in post-procedure anxiety scores in the VR group 	Level II/Grade B
Semerci et al., 2020	N = 74	<ul style="list-style-type: none"> • Comparing VR to SOC/control group, pain scores were significantly higher in the control groups 	Level III/ Grade A

IMPLICATIONS FOR NURSING PRACTICE:

- Nursing-related barriers to optimal children's pain management: staff shortages, deficient knowledge, inappropriate attitudes, demanding workloads, analgesic shortages, and low prioritization of pain management.³
- Nurses have more contact with the child and family than other members of the health team, so they're in an optimal position to reduce the impact these barriers have on pediatric pain management.⁸
- VR is a safe and highly feasible intervention, as it's relatively inexpensive, totally noninvasive, and doesn't require much oversight from researchers or healthcare providers.²

THE CNL ROLE:

Team Manager:

- Importance in pediatrics: care plans must include the entire family.¹⁴
- The CNL could serve as a liaison between patients, patients' families, and members of the healthcare team, allowing for better continuity of care.¹⁴
- The CNL could coordinate the activities and services provided through interdisciplinary meetings that include the patient and their family.¹¹

Patient Advocate:

- Importance in pediatrics: patients cannot always advocate for themselves, so the burden falls on family members.¹⁴
- Families often they lack sufficient medical education to effectively advocate for their children.¹⁴
- The CNL could advocate for the implementation of VR as a pain management distraction tool, serving as the unit champion for VR, educating staff on the benefits, providing demonstrations on how it works, and requesting feedback for implementation.

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REFERENCES:

