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Examining the Efficacy of Virtual Reality Distraction Therapy

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Examining the Efficacy of Virtual Reality Distraction Therapy in Pediatric Patients

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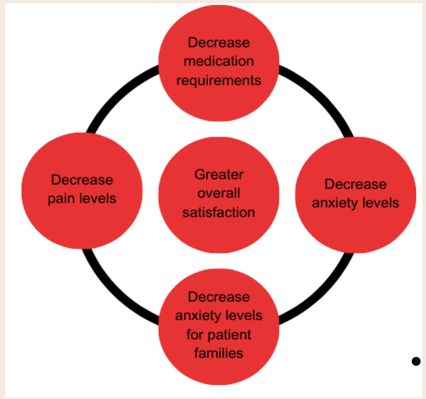
Background

- Despite over 20 years of virtual reality (VR) research, there is limited utilization as an adjunctive therapy in the pediatric hospital setting
- Based on literature review, VR has shown the possibility to decrease pain, anxiety, and fear in patients and families

Purpose

Evaluate the effectiveness of virtual reality as a therapeutic procedural support tool to reduce patient anxiety and pain levels, as well as assess its impact on the anxiety of patient families

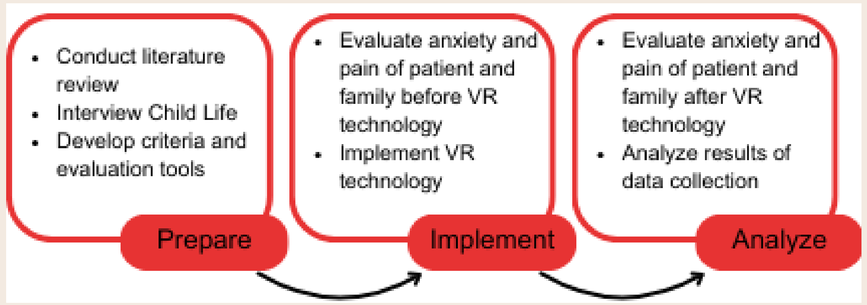
Objectives



Child Life Specialist Interview Highlights

- Interview with Benita Ozoude, Child Life Specialist (CLS)
- CLS uses Kind VR headsets, which are specifically designed for hospital patients
- Recommendations:
  - conduct a mini screening prior to VR regarding issues with vision, nausea, headaches, and fear of heights
  - verbalize each step of procedure, even while using VR distraction

Implementation

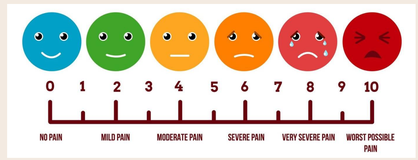


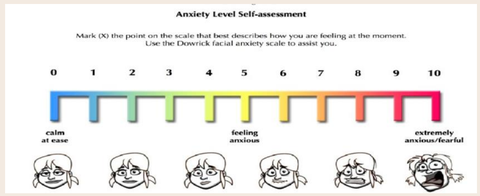
Criteria

- Undergoing minor procedures (PIV placement, catheterization)
- 8-18 years old
- No cognitive or physical impairments that impede safety
- No history of claustrophobia
- No history of seizures
- No fresh cranial incisions

Assessment

- Visual analog scales (VAS) used to rate pain and anxiety before *and* after VR therapy





- mYPAS scale used when VAS not appropriate
- Survey for parents after VR therapy

References

Evidence table

PICOT

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Findings

Limited data was collected on this intervention due to many restrictions, namely:

- Limited involvement from unit staff
- Low population size on C10/D10 fitting criteria
- Use and access limited to CLS availability
- Unable to use at night to promote sleep
- Limited time due to required EBP topic change

Recommendations

- Allow nurses to utilize VR without supervision from CLS
- Dedicated VR headset for VAT team and each unit
- More time and opportunities for implementation
- Increased education and awareness on VR

	Citation (author, date, title, year)	Evidence Type (i.e guideline, benchmark, research)	Sample, size, participants, setting (If applicable)	Findings that help answer the EBP topic/ question	Limitations	Evidence Level/ Quality	Notes
Madeline	Oh, N., Parrish, N., Lee, I. W., Temple, S., Perkins, O., & Kokkinakis, M. (2023). Using Virtual Reality to Reduce Anxiety and Improve Hospital Experience in Paediatric Orthopaedic Patients and Their Parents. Children, 10(8), 1409. https://doi.org/10.3390/children10081409	Research, quasi-experiemental	- Orthopaedics department at Evelina's Children Hospital - 64 children aged from 4 to 18 years old - children in fracture clinic or pre-op - Both the control group and intervention group had similar demographics and were controlled for age, sex and type of procedure	- significant reduction in parental and patient anxiety following VR (Likert scale) both in the fracture clinic and preop setting - All patients and their guardians 'strongly agreed' or 'agreed' that the use of VR distraction and play was beneficial to/improved their hospital experience	- the majority of VR patients in preop (16/23) reported 0 pain before the intervention and therefore a reduction would not be possible to observe	Quasi-experimental Study, level II, high	- combining VR with a play specialist could potentially yield even more significant reductions in both child and parental anxiety, and potentially pain as well. The effect of VR and the expertise of a play specialist may create a more immersive and tailored experience, thereby enhancing the overall therapeutic impact
Madeline	Gerçeker, G. Ö., Bektaş, M., Aydınok, Y., Ören, H., Ellidokuz, H., & Olgun, N. (2021). The effect of virtual reality on pain, fear, and anxiety during access of a port with huber needle in pediatric hematology-oncology patients: Randomized controlled trial. European journal of oncology nursing : the official journal of European Oncology Nursing Society, 50, 101886. https://doi.org/10.1016/j.ejon.2020.101886	Research, quantitative	- Hematology-Oncology unit at two university hospitals in Izmir, Turkey - 42 children aged from 6 to 17 - children recieving access to the venous port with Huber needle	- the VR group had a 2.5-point greater decrease in pain compared to control - there was a 1-point decrease in fear scores and a 2-point decrease in anxiety scores before and after the procedure in the VR group while there was no decrease in the control group	- there are limited scales to measure fear and anxiety (CFS and CAM-S used in this study)	Level I, High	N/A
Morgan	Tas FQ, van Eijk CAM, Staals LM, Legerstee JS, Dierckx B. Virtual reality in pediatrics, effects on pain and anxiety: A systematic review and meta-analysis update. Paediatr Anaesth. 2022 Dec;32(12):1292-1304. doi: 10.1111/pan.14546. Epub 2022 Sep 1. PMID: 35993398; PMCID: PMC9804813.	Research, systematic review	27 studies compiled with varying engagement from multiple units-	This meta analysis found that VR was effective in reducing anxiety and self reported pain and helped with pediatric procedures	The current review has several limitations that should be considered when interpreting the results. First, the number of studies using VR as a way of exposure are still low, and thus, more research into exposure is needed before accurate conclusions can be drawn from the results. Second, quality assessment scores of the included studies varied. While randomization and concealed treatment allocation were applied in most studies, intention-to-treat analyses were missing in most studies. Additionally, barely any of the studies included possible moderating factors of VR effectivity. Third, heterogeneity was mostly between 60% and 70%, which can be seen as substantial heterogeneity.	Level I, High	N/A
Skylar	Rao DG, Havale R, Nagaraj M, Karobari NM, Latha AM, Tharay N, Shrutha SP. Assessment of Efficacy of Virtual Reality Distraction in Reducing Pain Perception and Anxiety in Children Aged 6-10 Years: A Behavioral Interventional Study. Int J Clin Pediatr Dent. 2019 Nov-Dec;12(6):510-513. doi: 10.5005/jp-journals-10005-1694. PMID: 32440065; PMCID: PMC7229378.	Research, quantitative	30 children of age 6–10 years came to the Department of Pedodontics and Preventive Dentistry from September 2018 to October 2018.	The mean scores were 8.07 ± 2.20 and 3.13 ± 1.25 when baseline to during treatment was compared and to baseline and after treatment, mean score is 8.07 ± 2.20 and 1.07 ± 1.26, respectively. The mean scores during treatment and after treatment were 3.13 ± 1.25 and 1.07 ± 1.26, respectively. This assessment stipulates that pain perception in children was reduced by using visual reality distraction. On comparing pulse rate of study participants at different time intervals there is a gradual decrease in pulse rate observed from baseline to during treatment and after treatment which was highly statistical significance	it would be better if different treatment procedures were evaluated separately, if both the genders are recruited equally and trait anxiety was not evaluated.	Level I, High	Pain is a subjective one and its perception depends on several factors like physiological, psychological, social, culture and to some extent on genetics. Assessment of anxiety through (A) Pulse rate; (B) Oxygen saturation. the child was taken into a different environment by applying VRD which is devoid of the operator's field and its sounds.
Skylar	Gold JI, SooHoo M, Laikin AM, Lane AS, Klein MJ. Effect of an Immersive Virtual Reality Intervention on Pain and Anxiety Associated With Peripheral Intravenous Catheter Placement in the Pediatric Setting: A Randomized Clinical Trial. JAMA Netw Open. 2021 Aug 2;4(8):e2122569. doi: 10.1001/jamanetworkopen.2021.22569. PMID: 34432011; PMCID: PMC8387848.	Research, quasi-experiemental	This randomized clinical trial was conducted from April 12, 2017, to July 24, 2019, among 107 patients aged 10 to 21 years who were undergoing PIVC placement in 2 clinical settings (a radiology department and an infusion center) at an urban pediatric academic medical center in the US.	Patients who received the VR intervention compared with standard care had significantly lower mean post-PIVC anxiety scores when patient-reported Outcomes were analyzed using generalized linear modeling with backward stepwise selection for final model building	Although this study used a prospective randomized clinical trial design, the nature of patient-reported, caregiver-reported, and clinician-reported outcomes introduces bias and subjectivity	Level II, High	article compared standard care (simple distraction techniques [eg, music, coloring, singing, and talking] and the application of numbing cream to VR distraction
Tomas	Cybersickness in Virtual Reality: The Role of Individual Differences, Its Effects on Cognitive Functions and Motor Skills, and Intensity Differences during and after Immersion. https://doi.org/10.3390/virtualworlds3010004	Research, quantitative	VR. is used in multiple domains, therefore understanding the effect of cybersickness on humans is important. This study used 30 participants, 20-45 years old	The findings of this study inform the necessary safety protocols to be integrated into the procedural care and performance standars when utilizing V.R. equipment	Cybersickness in V.R. appears to be both a result of hardward and software issues. Challenges such as refresh rate discrepencies contribute to a disorienting experience.	Level I, High	If cybersicknes symptoms subside or change immediately after V.R. exposure, then soley post immersion evaluations could lead to unreliable conclusion.
Tomas	Donovan Jones, Roberto Galvez, Darell Evans, Michael Hazelton, Rachel Rossiter, Pauletta Irwing, Peter S Micalos, Patricia Logan, Lorraing Rose, Shanna Fealy: The Integration and Application of Extended Reality (XR) Technologies within the General Practice Primary Medical Care Setting: A Systematic Review. https://doi.org/10.3390/virtualworlds2040021	Research, qualitative	Digital technologies where used during the COVID pandemic to reduce the transmision of infection. The study correlates the patient experiences and outcome variables that allowed the techonology to expand after the pandemic	This study has conceptualized a framework outlining guidelines for V.R. technologies in healthcare settings, while also identifying safe practices that could facilitiate their broader utilization beyond clinical environments, including in home settings.	The accesibility of V.R. technology in hospitals is hindered by several limitation, including cost, technical complexity, troubleshooting, systems integration, limited accessibility, and the limited evidence base. However, despite these challenges the V.R. format hold significant potential for expansion and growht once these barriers are addressed, particularly through the reduce cost.	Level I, High	V.R shoes potential to help delivery of personalized mental health assesments and therapies, and acting as a potential medium for the delivery of health promoting content.