Can virtual reality be used to manage pain at a pediatric hospital?

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Virtual reality has emerged into popular culture with an ever-widening array of applications including clinical use in a pediatric healthcare center. Children undergo necessary yet painful and distressing medical procedures every day, but very few non-pharmaceutical interventions have been found to successfully manage the pain and anxiety associated with these procedures. Investigators at Children's Hospital Los Angeles have conducted a study to determine if virtual reality (VR) can be effectively used for pain management during blood draw. Their findings showed that VR significantly reduced patients' and parents' perception of acute pain, anxiety and general distress during the procedure. The results of the study are published in the *Journal of Pediatric Psychology*.

"Given the immersive and engaging nature of the VR experience, this technology has the capacity to act as a preventative intervention transforming the blood draw experience into a less distressing and potentially pain-free medical procedure, particularly for patients with more anxiety about having their blood drawn," said Jeffrey I. Gold, PhD, the director of the Pediatric Pain Management Clinic at Children's Hospital Los Angeles.

While previous research supported the effectiveness of distraction during painful procedures, specifically needle pain, the investigators hypothesized that the new VR technology, an arguably more powerful and immersive intervention could be even more effective at reducing pain and anxiety.

Gold and study co-author Nicole E. Mahrer, PhD, of the Department of Anesthesiology Critical Care Medicine at CHLA, theorize that 'VR analgesia' or pain control originates from the neurobiological interplay of the parts of the brain that regulate the visual, auditory, and touch sensory experience to produce an analgesic effect.

For the study, they recruited patients, ages 10 to 21 years, the patient's caregiver and the phlebotomist in the outpatient blood draw clinic, and randomized them to receive either standard of care, which typically includes a topical anesthetic cream or spray and a movie playing in the room, or standard of care plus the virtual reality game when undergoing routine blood draw. Looking at pre-procedural and post-procedural standardized measures of pain, anxiety and satisfaction, researchers found that VR is feasible, tolerated, and well-liked by patients, their parents and the phlebotomists.

"VR, especially immersive VR, draws heavily on the limited cognitive resource of attention by drawing the user's attention away from the hospital environment and the medical procedures and into the virtual world," said Gold who is also a professor of Anesthesiology, Pediatrics, and Psychiatry & Behavioral Sciences at the Keck School of Medicine of USC.

Given the significant concerns about problematic opioid use, evidence-based support for non-pharmaceutical inventions may lead to use of VR for pain management during certain medical procedures and a decreased need for narcotics.

"Ultimately, the aim of future VR investigations should be to develop flexible VR environments to target specific acute and chronic pain conditions," added Gold.

More information: Jeffrey I. Gold et al, Is Virtual Reality Ready for

Prime Time in the Medical Space? A Randomized Control Trial of Pediatric Virtual Reality for Acute Procedural Pain Management, *Journal of Pediatric Psychology* (2017). DOI: 10.1093/jpepsy/jsx129