Abstract

Introduction: Venipuncture-related pain is one of the most common and distressing experiences for children in clinical settings, often leading to fear, anxiety, treatment resistance, and reduced cooperation. Given the limitations and potential side effects of pharmacological methods, non-pharmacological interventions, particularly distraction techniques, have gained significant attention. This study aimed to compare the effects of mobile-based animation and virtual reality (VR) on the severity of venipuncture pain in children.

Methods: This randomized clinical trial was conducted on 135 children aged 6 to 12 years admitted to Imam Khomeini Hospital in Borujerd in 2025. Participants were selected via convenience sampling and subsequently assigned to one of three groups, mobile-based animation, virtual reality, or a control group, using stratified block randomization. In the intervention groups, the animation was initiated five minutes before the procedure and continued until its completion, while the control group received routine care. Pain severity was measured immediately following venipuncture using the Visual Analog Scale (VAS). Data were analyzed using one-way analysis of variance (ANOVA) and Tukey's post-hoc tests, adjusting for age as a covariate.

Results: The results of the one-way ANOVA indicated that, after adjusting for age, there was a statistically significant difference in mean pain scores among the three study groups ($P<0.001$). Tukey's post-hoc analysis revealed that mean pain scores in both the mobile-based animation and virtual reality groups were significantly lower than those in the control group; however, no significant difference was observed between the two intervention groups ($P>0.05$). In other words, both distraction methods were effective in reducing venipuncture-related pain in children, with neither demonstrating statistical superiority over the other.

Conclusion: Animation, whether delivered via a mobile screen or virtual reality goggles, is an effective method for reducing children's self-reported venipuncture pain. The engaging visual content of the animation effectively distracts the child from the painful stimulus, with the specific delivery technology proving to be insignificant. Therefore, considering cost-effectiveness and greater accessibility, the use of mobile displays for distraction to mitigate venipuncture pain by nursing staff is recommended.

Keywords: Pain, Venipuncture, Child, Animation, Virtual Reality, Distraction.