Analyses

• Analyses were per-protocol, eliminating participants who withdrew after randomization or were noncompliant.

• Wilcoxon signed-rank tests were conducted using R (version 3.6.3) to examine between group differences in anxiety reported before and during phlebotomy, as well as the between groups difference in Induction Compliance.

Results

• Forty-seven participants (21 female) were randomized to a VR group (n=24) or a control group (n=23).

• Baseline characteristics were comparable between the VR and control groups (Table 1).

• VR participants experienced a 41.7% mean decrease in anxiety (12.5% decrease for control) and a 26.4% decrease in fear (10.3% increase for control) from baseline to post-procedure (Figure 1 and Figure 2, respectively).

• The mean pain rating for the VR group was 2.33 SD=1.79, while the mean in the control group was 3.61 SD=2.29. The mean difference between groups was significant (p=0.0398).

Discussion

• The ability to utilize interactive distraction tools in pediatric populations may streamline phlebotomy procedures by reducing symptoms of noncompliance, resulting in widespread positive implications for clinicians, participants, and caregivers.

• The between-groups difference in cumulative induction compliance score demonstrates that using virtual reality during phlebectomy can improve the safety of these procedures, for both patients and clinicians, through reducing potentially dangerous reactions such as kicking and flailing.

• Additionally, as determined by the between-groups ICC measure, participants who received the Virtual Reality intervention were less likely to engage crying and screaming behaviors during phlebectomy, demonstrating that Virtual Reality may reduce anxiety in both participants and other patients in their proximity through reducing unpleasant and anxiety-provoking noises.

Limitations & future directions

• As the present study compared VR to a control group that received the standard of care without other technology, future VR research should trend towards comparing VR to technology that is already prevalent and accessible for participants in clinical settings, such as television.

• Comparing VR to a control of personal electronic devices of the participants’ choice may be the next step in evaluating VR.

• Studying VR under these conditions will be integral in providing evidence for clinicians to determine whether this technology is worth purchasing.

• In the present study, post-randomization withdraw for control group participants occurred on multiple occasions. An active control group may mitigate post-randomization withdraw.

• The present sample consists of predominately Caucasian and Asian participants. Future studies could benefit from recruiting a more racially diverse sample.

Conclusions

• These preliminary results suggest that playing interactive games on a VR headset could be an effective tool for reducing a participants’ fear and anxiety during phlebotomy for clinical trials.

• Increasing patient and caregiver satisfaction can increase patient retention in studies.

• Increasing clinician satisfaction can improve workflow and patient interactions.

• The present study was a pilot study, with a small participant cohort. A larger cohort and greater statistical power may produce more robust findings.

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