Using home-based augmented reality storybook training modules for facilitating emotional functioning and socialization of children with autism spectrum disorder

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Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental disability that is becoming more common worldwide. The disorder primarily affects social interaction and self-regulation skills. Effective interventions are necessary to enhance social interaction skills and emotional regulation in children with ASD. This study aimed to develop and test augmented reality (AR) training modules that can be used at home for preschool children with ASD. The study recruited five and fifteen preschool children (aged 3-5 years) with ASD, respectively. The treatment outcomes were evaluated from two perspectives: therapists and parents. The results were measured using the Functional Emotional Assessment Scale and Vineland Adaptive Behavior Scales. The Wilcoxon signed-rank test was used to compare emotional functioning and adaptive behavior differences. The study showed that the home-based AR storybook training modules were feasible, and preschool children with ASD showed significant improvement in their emotional functioning ($z = -2.03$, $p = 0.042$) after the 8-week intervention. The caregivers of preschool children with ASD who used the home-based AR training modules also indicated high or moderately high satisfaction. Fifteen children received 8-week home-based AR training modules, with sessions held four times a week for 20 minutes each time. After using the home-based AR training modules, the children's emotional functioning ($z = -2.01$, $p = 0.044$) showed significant improvement, with a large effect ($r = 0.53$) for the pre- and post-intervention phases. The data on Vineland-3 of the socialization subdomain ($z = -1.99$, $p = 0.046$) and overall adaptive function ($z = -2.55$, $p = 0.011$) showed significant improvement, with large effects ($r = 0.54$ and 0.70, respectively). The results of this study provide promising evidence supporting the feasibility and applicability of home-based AR training modules. Practitioners and researchers could suggest caregivers use AR training modules at home to increase the emotional functioning and adaptive behavior of preschool children with ASD.