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*abstract*

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# **Evaluation of the use of a Virtual Reality Distraction Technique to Alleviate Treatment-related Anxiety in Patients Undergoing Radiotherapy: An Evidence-based Evaluation and Review**

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**Introduction:** Psychological distress affects approximately 40% of radiotherapy patients, with environment-induced anxiety triggering physiological responses that compromise dose precision. While traditional non-pharmacological interventions like music therapy show inconsistent efficacy, a significant gap remains in identifying robust methods to reduce patients' anxiety during radiation delivery. Consequently, this study evaluates the success of virtual reality (VR) in diverse healthcare settings to balance proven procedural benefits against the unique technical constraints of the radiotherapy suite.

**Methodology:** A narrative literature review was conducted using the PICO framework across Scopus, PubMed, and the University of Liverpool Discover engine. Inclusion criteria targeted English-language clinical trials and reviews published since 2014. Following a quality screen using the Critical Appraisal Skills Programme (CASP) tool, seven primary papers were selected for synthesis. Data extraction compared VR against standard care or alternative interventions, focusing on patient-reported anxiety, pain perception, and physiological stability.

**Results:** Evidence from seven primary studies demonstrated that VR significantly reduced patient-reported anxiety and pain compared to standard care or music therapy. Technical evaluations confirmed that eye-tracking-based systems enabled high-fidelity immersion without head movement, ensuring compatibility with strict radiotherapy and MRI immobilisation standards. Furthermore, passive VR content combined with breathing exercises stabilised heart rate variability and respiratory patterns, which is clinically vital for Deep Inspiration Breath Hold (DIBH). Implementation correlated with enhanced staff satisfaction and reduced procedural duration, thereby increasing treatment throughput with no reported cybersickness in stable virtual environments. These findings highlight VR as a feasible tool to improve patient cooperation and workflow efficiency. However, interpretation of the findings is limited by methodological heterogeneity and reduced applicability to specific treatment contexts, including head and neck radiotherapy.

**Conclusion:** Evidence demonstrates that VR is a promising non-pharmacological intervention to.

alleviate radiotherapy-related anxiety through immersive distraction and physiological stabilisation. To facilitate clinical integration, future research should transition to clinical trials and prioritise developing customised VR systems tailored to specific treatment sites to establish evidence-based oncology guidelines

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