

# INPLASY

## The Effect of Virtual Reality on Postoperative Patient Outcomes in Children: A Systematic Review

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### ADMINISTRATIVE INFORMATION

**Support** - No grant or financial support was obtained from a private or official institution or non-profit organization for the study.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202480124

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 August 2024 and was last updated on 27 August 2024.

### INTRODUCTION

**Review question / Objective** Population: Patients aged 18 years and younger undergoing surgery, Interventions: VR interventions, Comparison: Intervention with control groups receiving standard treatment distraction interventions with virtual reality with care, outcome: the effectiveness of virtual reality application in the perioperative period in children on patient outcomes in the postoperative period. Study type: RCTs.

**Rationale** The application of virtual reality, which is the technique of distraction at the beginning of non-pharmacological methods, makes it easier for children to cope with surgical procedures because it immerses them in another environment with multidimensional sensory stimuli and allows them to have a realistic experience, and it is recommended to use it because it provides distraction from postoperative problems. This study aims to synthesize to evaluate the

effectiveness of virtual reality application in the perioperative period in children on patient outcomes in the postoperative period.

**Condition being studied** The perioperative period is an important experience in children's lives. Children are more sensitive and vulnerable because their routines, environments, expectations and roles change. They are not adequately equipped to cope with or adapt to these changes. Especially children who have difficulty in understanding what is happening in surgical procedures may experience physiological and psychological problems that will affect the surgical outcome during the surgical process. In the preoperative and postoperative period, these physical, behavioural or emotional problems in children can negatively affect the treatment and recovery process as well as the child's quality of life and patient satisfaction. Virtual reality is applied as a non-pharmacological intervention for the physical, psychological and social well-being of children who will undergo surgery. For this reason,

this study provides a comprehensive and up-to-date study of the ameliorative effect of virtual reality application on postoperative problems in children in the perioperative process.

## METHODS

**Search strategy** In this study, which was designed as a systematic review, the 27-point PRISMA study protocol was used to conduct the systematic review and write the article. This study, which analysed the studies that evaluated the effect of the use of virtual reality on postoperative patient outcomes in children undergoing surgery, was conducted by reviewing the relevant literature. The study searched English, Medline/PubMed, Web of Science, ScienceDirect, Scopus databases between October and December 2023. The keywords used in the review of databases included "virtual reality and/or paediatric and/or surgery and/or postoperative". Randomised controlled trials investigating the efficacy of virtual reality applications in children undergoing surgery in 2017 and published until 20 December 2023 were included in the review.

**Participant or population** Patients aged 18 years and younger undergoing surgery.

**Intervention** The studies should have been conducted in 2017-2023,  
Research published in English,  
Working with paediatric patient group  
Having received general anaesthesia  
Involving paediatric patients receiving anxiolytic premedication or diagnosed with certain cognitive disorders (psychiatric disorders, autism spectrum disorder);  
Access to the full text of the articles  
The studies are randomised controlled studies with high level of evidence.  
Studies evaluating the effectiveness of virtual reality goggle applications in the perioperative period on patient outcomes in the postoperative period.

**Comparator** In this study, postoperative pain, compliance, postoperative behavioural problems, parental satisfaction, anxiety, and postoperative pain, compliance, postoperative behavioural problems, parental satisfaction, and anxiety were evaluated with standard care and virtual reality interventions during the surgical process in children.

**Study designs to be included** randomized controlled studies.

**Eligibility criteria** Inclusion criteria for the articles included in the systematic review:

The studies should have been conducted in 2017-2023,

Research published in English,

Working with paediatric patient group

Having received general anaesthesia

Involving paediatric patients receiving anxiolytic premedication or diagnosed with certain cognitive disorders (psychiatric disorders, autism spectrum disorder);

Access to the full text of the articles

The studies are randomised controlled studies with high level of evidence.

Studies evaluating the effectiveness of virtual reality goggle applications in the perioperative period on patient outcomes in the postoperative period,

Exclusion criteria for the articles included in the systematic review:

A sample size of twenty-five or less,

The presence of the research in more than one database (In this case, it was evaluated as cited from only one database).

It is written in a language other than English,

Case reports, book chapters, descriptive studies, reviews, systematic reviews, scale

studies, case reports and research articles written in a language other than English

were not included in this review.

**Information sources** Medline/PubMed, Web of Science, ScienceDirect, Scopus databases were used. Grey literature was not included in the search.

**Main outcome(s)** The studies were grouped and analysed by searching four databases. The studies obtained as a result of the quality and bias assessment, data extraction and synthesis processes were assessed. After screening, 731 relevant studies were retrieved from the search engines. After removal of repetitive studies, 700 studies were scanned. A preliminary assessment was made on the basis of the title and abstract and 663 studies were excluded because they did not meet the inclusion criteria. The remaining 37 studies were assessed for eligibility and 5 studies were included in the systematic review. The studies were randomised controlled trials published between 2017 and 2023 with a sample group of paediatric patients undergoing surgery. The main conclusion from the five included studies is as follows: In general, the conclusion of the studies was that children who were shown interactive video games had a positive effect on postoperative outcomes.

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**Data management** We followed Preferred Reporting for Systematic Review and Meta-Analysis (PRISMA) to conduct this systematic review and meta-analysis.

**Quality assessment / Risk of bias analysis** Using the Joanna Briggs critical appraisal tool (for randomised controlled trials). These indice respectively includes 13 items, and for the evaluation of four types of biases (selection bias, performance bias, detection bias, and attrition bias). The scale items are scored as “Yes” = 1 point, “No–Unclear,” and “Not Applicable” = 0 points. A high total score indicates a high-quality study methodology They were independently assessed and compared for consistency.

**Strategy of data synthesis** A narrative synthesis was conducted because the selected articles varied significantly. Narrative synthesis is a methodology used in systematic reviews and synthesis of findings from multiple studies. It primarily relies on using words and text to summarize and elucidate the results of the synthesis. This method can accommodate many study designs and outcome assessment methods. Meta-analytic approaches were impossible due to study heterogeneity and insufficient inferential statistics reporting. Aspects of the research that are relevant to the research question.

**Subgroup analysis** This study involved thematic content analysis of the collected data. Content thematic analysis is used to identify the main patterns and themes that emerge from the data analysed. This approach was chosen because it allows the researcher to explore the qualitative. The main findings of the included studies were identified and the author's name, year and study type, purpose of the study, location and sample size/scope of the study, time and frequency of application of virtual reality and study outcomes of all studies included in the systematic review.

**Sensitivity analysis** The interrater reliability analyses of those researchers who undertook the scoring using the Quality list were analysed using the SPSS.

**Language restriction** Research published in English.

**Country(ies) involved** Turkey.

**Keywords** virtual reality, pediatric, surgery, postoperative.

### Contributions of each author

Author 1 - Aynur Çakmak - Determination of the design of the research; Formulating a research question; Inclusion and Exclusion Criteria; Literature review and selection of studies; Scanning of databases; Identification and Segregation of Research; Evaluation of the Quality of Research; Data analysis; Discussion of the Outcomes of the Study.

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