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INPLASY

A narrative review of the effectiveness of Virtual reality among patients with cardiopulmonary disorders

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ADMINISTRATIVE INFORMATION

Support - NIL.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2024100092

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 October 2024 and was last updated on 21 October 2024.

INTRODUCTION

Review question / Objective The objective of this study is to evaluate the literature and outline the usefulness of virtual reality in rehabilitation for patients with cardiopulmonary illnesses and offer insights on enhancing physiological and physical qualities as clinical results of this procedure.

Rationale To outline the current evidence on efficacy of virtual reality therapy in improving the status of physical health for cardiopulmonary ailments.

Condition being studied Cardiopulmonary Disorders.

METHODS

Search strategy Condition/population – patients undergoing cardiopulmonary rehabilitation either post-surgery or pre-surgery.

Types of study included – literature reviews, systematic reviews, mixed method studies, randomized control trials, experimental studies, and observational studies.
Keywords – physical rehabilitation, cardiopulmonary, virtual reality, aerobic, heart disease, COPD, ischemic heart disease, heart failure, quality of life.
Databases searched – Google scholar, PubMed, Science Direct, Scopus
Year searched – 2014-2024
Language – English.

Participant or population Patient's with cardiopulmonary disorders.

Intervention Virtual Reality.

Comparator Conventional Physiotherapy Intervention, including Aerobic Exercises.

Study designs to be included RCT's, Non - RCT's, Case studies, Case Series, Pilot Feasibility Trials.

Eligibility criteria
1. Studies involving patients undergoing cardiopulmonary rehabilitation
2. Research papers focusing on current evidence on virtual reality.
3. Research supporting virtual reality benefiting physical, psychological and performance related health.
4. Evidence between 2014 – 2024.

Information sources Google Scholar, Research Gate, PubMed, Science Direct, Scopus, CINHL, Mendeley, PEDro.

Main outcome(s) Metabolic Equivalent of Task (METs), VO_2 Max (Maximal Oxygen Uptake), Exercise Tolerance Test (ETT) or Stress Test, Six-Minute Walk Test (6MWT).

Additional outcome(s) Pulmonary Function Tests (PFTs), Blood Pressure and Oxygen Saturation.

Data management
1. Data Collection and Extraction
- Standardized Data Extraction Form: A data extraction form will be designed to collect relevant information systematically from all included studies. This form will be piloted on a few studies to ensure it captures all necessary details and is easy to use.
Key data points include:
Study characteristics (author, year, country, study design)
Population characteristics (sample size, age, type of impairment, medical condition)
Intervention characteristics (type of virtual reality, duration of use, rehabilitation protocol)
Outcomes measured (mobility, functional independence, quality of life, patient satisfaction)
Key findings (effectiveness, adverse events, challenges, limitations)
Funding sources and conflicts of interest (if reported)
Software for Data Collection: Data will be collected using reference management and data extraction tools. Potential software options include:
Excel/Google Sheets: For structured data entry and easy collaboration among reviewers.
Covidence: For managing systematic review data, including screening, extraction, and reporting.
Rayyan: A web tool for screening studies with an intuitive interface for easy tagging and note-taking.
2. Data Storage: Cloud-Based Storage: All documents, data extraction forms, and study records will be stored in a secure cloud-based platform (e.g., Google Drive, Dropbox) to ensure accessibility and real-time collaboration among team members.
Backup: Data backups will be regularly scheduled to ensure no loss of information during the review process. Multiple versions of the extraction files will be saved to preserve the audit trail and track changes.
3. Data Privacy and Security - Access Control: Only authorized team members will have access to the review data. Permissions will be managed through the cloud platform, and data will be encrypted if necessary, ensuring the
protection of confidential or sensitive information.
- Data Anonymization: If patient-level data or sensitive information is encountered (e.g., in grey literature), appropriate anonymization methods.

Quality assessment / Risk of bias analysis It will be assessed using PEDro score and Cochrane tool rating the studies from high risk to low risk.

Strategy of data synthesis Data will be analyzed using SPSS version 26 for statistical analysis using SD and mean difference, with 95% confidence interval for continuous data.

Subgroup analysis It will be done by using random effects model and group analysis to explore heterogenicity.

Sensitivity analysis It will be done to assess the stability of the results and not by chance.

Language restriction English.

Country(ies) involved India.

Other relevant information N/A

Keywords Virtual Reality, Cardiopulmonary disorders, Cardiac Patients, Rehabilitation, Physiotherapy, Pulmonary Disorders, Quality of life.

Dissemination plans The findings of this narrative review will be disseminated through multiple channels to reach a broad audience of researchers, clinicians, and policymakers. The review will be submitted for publication in a peer reviewed journal focused on rehabilitation or physiotherapy. Additionally, results will be presented at relevant national and international conferences to engage with the professional community. To enhance accessibility, summaries and key findings will be shared through institutional platforms, social media, and open-access

repositories, ensuring wide reach and impact across healthcare and academic sectors.

Contributions of each author

Author 1 - Maitrayee Agrawal - Conception, methodology, data extraction, and writing the initial draft.
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Author 2 - Tanya Gujral.
Email: Tanya Gujral - Supervision, Development of the selection criteria, Revision of the draft, Approval of the final manuscript.
Author 3 - Mohammad Sidiq - Supervision, Development of the selection criteria, Revision of the draft, Approval of the final manuscript.
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