International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Digital Health Intervention in Patients Undergoing Cardiac Rehabilitation: Systematic Review and Meta-Analysis

INPLASY202420017
doi: 10.37766/inplasy2024.2.0017
Received: 05 February 2024
Published: 05 February 2024

Corresponding author:
ALI HARBI

capalialharbi@yahoo.com

Author Affiliation:
Department of Nursing , Faculty of Medicines and Health Sciences, Universiti Putra Malaysia (UPM).

Harbi, A[1]; Soh, KL[2]; Yubbu, P[3]; Soh, KG[4]; Japar, S[5].

ADMINISTRATIVE INFORMATION

Support - This work has no fund.

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202420017

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 February 2024 and was last updated on 05 February 2024.

INTRODUCTION

Review question / Objective This review aimed to investigate the impact of digital health intervention versus non-digital health intervention on the outcomes of interest for patients with cardiovascular disease.

Rationale The nonstop advancement in technology has introduced novel digital health intervention interventions, that warrant a comprehensive assessment of their effect on the outcomes for patients undergoing cardiac rehabilitation. The presence of new studies in this field provides an opportunity to consolidate and analyze the expanding body of literature. Moreover, the presence of varying results in previous works emphasizes the necessity for a rigorous meta-analysis to clarify consistent patterns, recognize potential sources of heterogeneity, and offer valuable perspectives into refining digital health intervention strategies for cardiac rehabilitation.

Condition being studied The intended population for this review and meta-analysis comprised patients with cardiovascular disease, including those who were diagnosed with heart failure, and myocardial infarction, and those who had undergone percutaneous intervention, coronary artery bypass graft, or valvular surgery.

METHODS

Search strategy This systematic review and meta-analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Two authors (ASH and PY) independently searched the following databases: PubMed, CINAHL, Scopus, and Cochrane Library. References of included studies were also searched

manually for studies not included in the primary search. The time filter was set to retrieve studies between 2000 and 2023. The two authors used Medical Subject Headings (MeSH) to determine the relevant alternative keywords used in the search process. The retrieved papers were initially checked by titles for potential inclusion in this systematic review and meta-analysis, and those which passed this stage were sequentially checked for eligibility by reading their abstracts and then full texts. Any conflict was resolved by discussion until consensus was reached among the authors, and the final decision about the included and excluded studies was made by the senior author (SKL).

Participant or population Patients with cardiovascular disease, including those who were diagnosed with heart failure, and myocardial infarction, and those who had undergone percutaneous intervention, coronary artery bypass graft, or valvular surgery.

Intervention Digital health intervention.

Comparator Patients who received Traditional home-based cardiac rehabilitation or usual care.

Study designs to be included Randomized controlled trials.

Eligibility criteria The inclusion criteria of this systematic review and meta-analysis entailed that included studies: (1) were randomized controlled trials; (2) studied populations of patients with CVD; (3) studied populations aged ≥ 18 years; (4) employed interventions using digital technology; (5) investigated the impact of DHI on one or more of the outcomes of interest; and (6) had follow-up periods of at least four weeks.

Information sources Databases: PubMed, CINAHL, Scopus, and Cochrane Library. References of included studies also were searched manually for studies not included in the primary search.

Main outcome(s) The outcomes of interest for this study are cardiometabolic risk factors, physical capacity, and QoL, specifically: systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), total cholesterol (TC), low-density lipoprotein (LDL), high-density lipoprotein (HDL), triglyceride (TG), blood glucose (BG), Six-Minute Walk Test (6-MWT), and peak oxygen consumption (VO2 peak).

Quality assessment / Risk of bias analysis The Cochrane Risk of Bias Tool (RoB 2) (Sterne et al., 2019) was used to assay risk of bias (RoB). Two authors (ASH and PY) independently evaluated the included studies based on the following domains: (1) random sequence generation (selection bias); (2) allocation concealment (selection bias); (3) blinding of outcome assessment (detection bias); (4) incomplete outcome data (attrition bias); and (5) selective reporting (reporting bias). RoB 2 provides signal questions for each domain, which the evaluator should use to make an overall RoB judgement (which can be low, high, or unclear).

Strategy of data synthesis Data analysis was performed in accordance with Cochrane handbook for systematic reviews of interventions (Higgins, 2022). using Jamovi software (Jamovi 24.11). Random effect statistical model was applied. To estimate the effect of DHI versus non-DHI, change in means from baseline (change score) and standard deviations were used. Heterogeneity was tested using I2, whereby values of 25%, 50%, and 75% indicate low, moderate, and high heterogeneity, respectively. Hypothesis testing was performed at a two-tailed 0.05 level and a 95% CI. If I2 values showed high heterogeneity (I2 > 50%). Publication bias was assessed visually by a funnel plot and statistically by the Egger test.

Subgroup analysis Subgroup analysis was performed based on duration of follow-up (≥ 3 months vs < 3 months), population average age (≥ 60 vs < 60 years) and medium of delivery (smartphone vs other methods).

Sensitivity analysis sensitivity analysis was performed by removing the study(s) that caused heterogeneity.

Language restriction The language filter was set to include studies that have been published in English.

Country(ies) involved Jordan and Malaysia.

Keywords digital; virtual; internet; remote; technology; tele rehabilitation; telehealth; mhealth; eHealth; wearable device.

Contributions of each author

Author 1 - ALI HARBI - Searched the databases for relevant studies; assess eligibility ; extracted the data from included studies; assess the risk of bias; conducting the statistics.
Email: capalialharbi@yahoo.com
Author 2 - Lam Soh Kim - The author read, provided feedback, and approved the final manuscript; finalize the eligible studies ; finalize the risk of bias and quality assessment.

Email: sklam@upm.edu.my
Author 3 - Putri Yubbu - Searched the databases for relevant studies; assess eligibility; extracted the data from included studies; assess the risk of bias; conducting the statistics.
Email: drputri@upm.edu.my
Author 4 - Geok Soh Kim - drafted the manuscript; participate in the statistical process.
Email: kims@upm.edu.my
Author 5 - Salimah Japar.