The effectiveness of eHealth interventions on moderate-to-vigorous intensity physical activity among cardiac rehabilitation participants: a systematic review and meta-analysis

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Background: Cardiac rehabilitation is a class IA recommendation for patients with cardiovascular diseases. Physical activity is the core component and core competency of cardiac rehabilitation programs. Cardiac rehabilitation guidelines recommend patients achieve at least thirty minutes of moderate-to-vigorous intensity physical activity five or more days per week. However, many patients with cardiovascular diseases are failing to meet recommended daily physical activity levels. eHealth interventions may increase moderate-to-vigorous intensity physical activity among cardiac rehabilitation participants.

Objectives: The objective of this study was to review the evidence of the effectiveness of eHealth interventions to increase moderate-to-vigorous intensity physical activity among cardiac rehabilitation participants. The secondary objective was to examine the effectiveness of eHealth interventions on improving exercise capacity, cardiovascular risk profile and health-related quality of life.

Methods: A comprehensive search strategy was developed for four electronic databases (PubMed, Web of Science, Embase and The Cochrane Library); through December 16, 2021. All studies reporting on eHealth interventions designed to increase moderate-to-vigorous physical activity among cardiac rehabilitation participants were included. Multiple non-blind reviewers determined study eligibility and extracted data. Risk of bias was evaluated using the Cochrane Collaboration Tool for randomized controlled trials and using the Effective Practice and Organisation of Care Cochrane Review Group for non-randomized controlled trials. Data quality using the Grading of Recommendations Assessment, Development and Evaluation professional guideline development tool. Data were pooled using a random-effects model. All statistical analyses were performed using Stata 17.

Results: Twenty-one studies were included in the review which fifteen were in the meta-analysis. The meta-analysis demonstrated eHealth interventions improved moderate-to-vigorous physical activity (standard mean difference = 0.17, 95% confidence interval: 0.07, 0.27, P < 0.001). No changes were observed in exercise capacity (P = 0.09), cardiovascular risk profile (body mass index, P = 0.19; waist circumference, P = 0.7; systolic blood pressure, P = 0.36; total cholesterol, P = 0.72; plasma glucose, P = 0.41) and health-related quality of life (P = 0.12).

Conclusions: eHealth interventions are effective at increasing minutes/week of moderate-to-vigorous intensity physical activity among cardiac rehabilitation participants. Future high-quality empirical studies are needed to evaluate the effectiveness of eHealth interventions delivered, with these sub-types (wearable devices, online web portal, smart phone application, messaging services and telephone calls) delivered alone or in combination delivered more conducive to moderate-to-high intensity physical activity.

Figure 1, Changes in minutes/week of MVPA.