Effectiveness of Mobile Health Interventions Promoting Physical Activity and Lifestyle Interventions to Reduce Cardiovascular Risk Among Individuals With Metabolic Syndrome: Systematic Review and Meta-Analysis

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Abstract
BACKGROUND: Physical activity and lifestyle interventions, such as a healthy diet, have been proven to be effective approaches to manage metabolic syndrome. However, these interventions require great commitment from patients and clinicians owing to their economic costs, time consumption, and lack of immediate results. OBJECTIVE: The aim of this systematic review and meta-analysis was to analyze the effect of mobile-based health interventions for reducing cardiometabolic risk through the promotion of physical activity and healthy lifestyle behaviors. METHODS: PubMed, Scopus, Web of Science, Cochrane Central Register of Controlled Trials, and SPORTdiscus databases were searched for experimental studies evaluating cardiometabolic risk indicators among individuals with metabolic syndrome who were included in technology-assisted physical activity and lifestyle interventions. Effect sizes, pooled mean changes, and their respective 95% CIs were calculated using the DerSimonian and Laird method. Outcomes included the following clinical and biochemical parameters: body composition (waist circumference [WC] and BMI), blood pressure (systolic blood pressure [SBP] and diastolic blood pressure [DBP]), glucose tolerance (fasting plasma glucose [FPG] and glycated hemoglobin A1c [HbA1c]), and lipid profile (total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol [HDL-C], and triglycerides). RESULTS: A total of nine studies were included in the meta-analysis. Owing to the scarcity of studies, only pooled mean pre-post changes in the intervention groups were estimated. Significant mean changes were observed for BMI (-1.70 kg/m2, 95% CI -3.20 to -0.20; effect size: -0.46; P=.03), WC (-5.77 cm, 95% CI -9.76 to -1.77; effect size: -0.54; P=.005), SBP (-7.33 mmHg, 95% CI -13.25 to -1.42; effect size: -0.43; P=.02), DBP (-3.90 mmHg, 95% CI -7.70 to -0.11; effect size: -0.44; P=.04), FPG (-3.65 mg/dL, 95% CI -4.79 to -2.51; effect size: -0.39; P<.001), and HDL-C (4.19 mg/dL, 95% CI 2.43-5.95; effect size: 0.23; P<.001). CONCLUSIONS: Overall, mobile-based health interventions aimed at promoting physical activity and healthy lifestyle changes had a strong positive effect on cardiometabolic risk indicators among individuals with metabolic syndrome. Nevertheless, further research is required to compare this approach with usual care in order to support the incorporation of these technologies in health systems. TRIAL REGISTRATION: PROSPERO CRD42019125461; https://tinyurl.com/y3t4wog4.

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