

Comparative effect of eHealth interventions on hypertension management-related outcomes: A network meta-analysis

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Abstract

Background: Increasingly, health professionals and patients have begun to be involved in eHealth interventions to assist in the self-management of hypertension. Therefore, this study was aimed at comparing the effect of different types of eHealth interventions (phone calls, blood pressure telemonitoring, emails, web-site, smartphone-app, short message service (SMS) and more than two eHealth interventions) on reducing systolic and diastolic blood pressure, increasing adherence to medication treatment, improving physical activity compliance, controlling blood pressure, and improving quality of life (QoL). Methods: A systematic search in MEDLINE (via PubMed), EMBASE, Cochrane Central Register of Controlled Trials, and Web of Science databases was conducted to identify experimental studies addressing the effect of eHealth interventions on the self-management of hypertension.

Comparative evaluation of the eHealth interventions effect were performed by conducting a standard pairwise meta-analysis and a network meta-analysis for direct and indirect comparisons between eHealth interventions and control/non-intervention. Results: Fifty-one studies were included in the analysis showing a moderate effect size for more than two types of eHealth interventions (-0.46; 95%CI: -0.64, -0.27, $p < 0.001$ and -0.29; 95%CI: -0.46, -0.13, $p < 0.001$), phone calls (-0.37; 95%CI: -0.57, -0.17, $p < 0.001$ and -0.29; 95%CI: -0.52, -0.07, $p = 0.011$) and smartphone-app (-0.26; 95%CI: -0.50, -0.01, $p = 0.040$ and -0.40; 95%CI: -0.70, -0.10, $p = 0.010$) on reducing both systolic and diastolic blood pressure, respectively.

Additionally, i) smartphone-app improved medication adherence by 45%; ii) more than two types of eHealth interventions and emails improved physical activity compliance by 18% and 57% respectively; ii) more than two types of eHealth interventions, phone calls, blood pressure telemonitoring, website and SMS improved blood pressure control between 16% and 30%; and iv) blood pressure telemonitoring showed a week effect on QoL Conclusions: Our study reported eHealth to be a suitable intervention for the self-management of hypertension. Considering our results and the population's accessibility to eHealth devices, eHealth could be a useful and largely scalable tool for

the self-management of hypertension. Systematic review registration: PROSPERO
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Author keywords

Blood pressure; eHealth; Hypertension; Network meta-analysis