

### **Dietary Education Delivered by Digital Health for Improving Dietary Intake and Clinical Outcomes in Chronic Conditions: A Systematic Review and Meta-Analysis**

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**Objectives:** To determine the effectiveness of dietary education delivered by digital health interventions for improving dietary intake and clinical outcomes in chronic conditions.

**Methods:** CINAHL, Cochrane CENTRAL, Embase and MEDLINE databases were systematically searched. Controlled trials involving dietary education delivered via digital health interventions (mobile or electronic health technology) to adults with chronic conditions were included. The dietary intervention component must have been developed or delivered by health professionals, or in line with best practice guidelines. Data was meta-analyzed by a random effects model for diet quality, fruit and vegetable consumption, dietary intake of fat, sodium, protein, fibre and energy, and various clinical outcomes. Screening, data extraction and quality assessment were completed in duplicate.

**Results:** Thirty-eight studies comprising 7,303 participants met the inclusion criteria. Digital health interventions included: mobile phone apps and messaging systems (n = 16), internet-based (n = 16), electronic software (n = 1) or a combination of these methods (n = 5). Studies showed digital health was effective at improving Mediterranean diet adherence score [standardized mean difference: 0.79; 95% confidence interval (CI): 0.18, 1.40] and overall fruit and vegetable intake [mean difference (MD): 0.58 serves per day; 95% CI: 0.01, 1.14]. However, no significant effects were found for other measures of diet quality, single food group intake, nutrients and energy intake. Digital health interventions significantly reduced waist circumference [MD: -2.34 cm; 95% CI: -4.29, -0.38cm), body weight [MD: -1.88; 95% CI: -2.60, -1.16 kg) and hemoglobin A1c levels [MD: -0.18%; 95% CI: -0.30, -0.05%). Overall the studies were rated as poor quality.

**Conclusions:** Dietary education delivered via digital health interventions significantly improved Mediterranean diet adherence, overall fruit and vegetable intake, waist circumference, weight and hemoglobin A1c levels. However, given the relatively poor quality of the studies, additional robust trials are needed to the guide implementation and scale-up of these interventions in health services.

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