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Personalized digital behaviour interventions increase short-term physical activity: a randomized control crossover trial substudy of the MyHeart Counts Cardiovascular Health Study

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Aims	Physical activity is associated with decreased incidence of the chronic diseases associated with aging. We previously demonstrated that digital interventions delivered through a smartphone app can increase short-term physical activity.
Methods and results	We offered enrolment to community-living iPhone-using adults aged ≥18 years in the USA, UK, and Hong Kong who downloaded the MyHeart Counts app. After completion of a 1-week baseline period, e-consented participants were randomized to four 7-day interventions. Interventions consisted of: (i) daily personalized e-coaching based on the individual's baseline activity patterns, (ii) daily prompts to complete 10 000 steps, (iii) hourly prompts to stand following inactivity, and (iv) daily instructions to read guidelines from the American Heart Association (AHA) website. After completion of one 7-day intervention, participants subsequently randomized to the next intervention of the crossover trial. The trial was completed in a free-living setting, where neither the participants nor investigators were blinded to the intervention. The primary outcome was change in mean daily step count from baseline for each of the four interventions, assessed in a modified intention-to-treat analysis (modified in that participants had to complete 7 days of baseline monitoring and at least 1 day of an intervention to be included in analyses). This trial is registered with ClinicalTrials.gov, NCT03090321.
Conclusion	Between 1 January 2017 and 1 April 2022, 4500 participants consented to enrol in the trial (a subset of the approximately 50 000 participants in the larger MyHeart Counts study), of whom 2458 completed 7 days of baseline monitoring (mean daily steps 4232 ± 73) and at least 1 day of one of the four interventions. Personalized e-coaching prompts, tailored to an individual based on their baseline activity, increased step count significantly ($+402 \pm 71$ steps from baseline, $P = 7.1 \times 10^{-8}$). Hourly stand prompts ($+292$ steps from baseline, $P = 0.00029$) and a daily prompt to read AHA guidelines ($+215$ steps

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