

Supplementary

Characteristics of studies

Author and Year	Country	Study Aim	Study Design	Population	Setting	Sample size	Study Duration	Intervention	Finding	Conclusion
Kramer et al. ^[28]	Switzerland	To evaluate the effect of financial incentives (personal/charity) in promoting PA	Clustered RCT	Aged ≥ 18	Enrolled from complementary insurance plan	N = 1,547, three groups (PFI=784, CFI=623, CG=140)	6 months	Three arms: personal financial (earn 10 CHF {Swiss Francs} for each month if the subject walked more than 10,000 steps/day, and 5 CHF for less than 10,000 steps/day), charity financial (donation to charity), no incentive. Either in the personal or charity financial group, the subject could win a maximum 60 CHF during 6 months.	1) Charity financial group increase steps-count in short-term (p=0.004), but the effect reduces after next 3 months (p=0.003). 2) Charity financial group had higher steps-count than control group and personal financial incentive, however, the difference was not significant statistically.	Small monthly charity/personal financial incentives contribute PA promotion using activity trackers. However, incentives strategy needs to be modified for long-term effect.
Glynn et al. ^[31]	Ireland	To evaluate the smartphone's effectiveness in increasing PA	RCT	>16 years old	Primary care centre	77	8 weeks	<u>Control and intervention groups</u> received information about exercise benefits and similar PA goal. <u>Intervention group</u> was taught how to use and get benefit from the application. Users report steps count by clicking 'share data' icon in the app	1) There was a significant change in steps-count for both groups favouring the intervention group. 2) Even there was increase in PA for control group but decreased to the baseline by the end of study period, while the increase in the steps-count was maintained for the intervention group.	The progress maintained over the study time.
Edney et al. ^[26]	Australia	To examine the users' engagement to increase PA when using an app and determine engagement rate and users'	Clustered RCT	18-65 years	Community-based Facebook group	N = 301, gamified group=141, basic=160	3 months	Two intervention groups: gamified app (gamified features and social {n=141}) + basic app (individual, n=160). Daily steps count generated by pedometer. All subjects received emails weekly about steps count summary. Participants in gamified group received weekly emails about app feature.	Overall result showed high use of both apps. 2) Gamified app users accessed the app more frequently than the basic group. However, daily access to app declines in both groups slightly over three-month period.	Social and gamified characteristics can enhance user engagement in PA.

characteristics

King et al. ^[27]	US	To test three different smartphone apps in improving PA and sedentary time	RCT	45 and older	Community-dwelling adults	N = 89	8 weeks	Three apps' features used in separate groups. <u>Four arms</u> : Social arm (n=22), Affect arm (n=22), Analytic arm (n=21), Control arm (n=24). Three apps with different features: <u>Social app</u> (the users can support each other and compare their achievements with others), <u>Affect app</u> (it appears in the form of a bird in the phone screen to reflect the users' activity or sedentary status), <u>Analytic app</u> (the user can view own goal and achievement and focus on self monitoring). <u>Intervention group</u> (regular and plus group): Received in-person counselling sessions, mobile application (developed by researchers to 1) send daily message/video clip, 2) record daily diary). The app sends a weekly goal for the users until steps count reach up to 10,000 steps/day. At 3 months, the app was removed from <u>regular group</u> 's mobile phones, while the app was kept for <u>plus group</u> (the reason was to understand and test the maintenance strategy when continuing to report feedback and self-monitoring). Accelerometers continue to measure PA for both groups. <u>Control group</u> : used accelerometer for 9 months but no intervention.	Social app showed the highest average change in PA and sedentary behaviour across the 8 weeks. The Affected and Social apps had significant less sitting time than Analytic app.	The study supports the use of Social framed app in improving PA and sedentary behaviour.
Fukuoka et al. ^[25]	US	To determine whether using mobile app with in-person counsel can increase and maintain PA	RCT	25-65 years (women)	Community-dwelling adults	N = 192	3 months intervention, 6 months maintenance	1) Hourly steps for plus group were higher than regular group (in the baseline data). 2) Over 9 months, Steps count for intervention group (plus + regular) remained higher than control group. 3) Steps count for regular plus group were similar in the 6 months maintenance period but decline over the period. 4) No difference in adherence rate on plus and regular group. 5) Age and BMI factors did not affect intervention maintenance.	1) Counselling achieved increase in PA in initial three months. 2) Using app did not help in maintaining PA for the next 6 months comparing to use accelerometer alone. 3) Self-monitor and providing feedback helps to increase PA in the first three months.	
Martin et al. ^[29]	Ireland	To evaluate the effect of	RCT	18-69 years	At academic	N = 48	5 weeks	The study used two intervention methods (texting +	There was a clear increase in PA for unblinded group	Automated tracking-texting

		texting and tracking on increasing PA			CVD prevention centre				tracking). Three arms (2:1), <u>unblinded</u> 32 subjects (16 subjects received encouragement text + 16 subjects did not receive texts), <u>blinded</u> (16 subjects).	who received reinforcement texts, while there was a decline in steps counts for blinded group. Unblinded no-texts group almost maintained the steps count.	feature leads to an increase in PA.
Harries et al. ^[24]	UK	To assess the impact of using smartphones on PA of healthy males	RCT	18-40 years (males)	Community	N = 152	6 weeks	Three arms: control group (no feedback), two intervention groups (individual feedback, group feedback). All participants received phone (included apps to count steps) and use instructions (emails).	1) Individual and social feedback groups had higher steps count than control group. 2) Two demographic data have affected the result: car ownership and employment status. Participants who have cars had less steps-counts than who had no car. Working participants, either part or full-time, had higher steps-count than unemployed participants.	Using apps and giving feedback, either individual or social feedback, have a significant effect of increasing PA among males.	
Peacock et al. ^[30]	UK	To examine the success of app that provides feedback combined with the trainer support to increase PA rate	RCT	40-70 years	Primary care	N = 184 (intervention group: 118, control group: 66)	12 months	Both groups received general information about PA. Intervention group: users taught how to use health app (MIPACT) + they were followed by trainers to review the user's goal, provide feedback, give information about the health benefits of PA, build self-belief.	Result shows equivalent statistical result in both groups.	Using app did not help to increase PA level for at risk of diseases participants.	