



Empirical Evaluation of Mobile Applications to Promote Walking in College Students : A Randomized Controlled Trial

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◆ Background

- In line with vast advancement of information technology, various mobile applications (apps) which aim to increase walking behavior have been developed (Lee et al., 2019).
- Previous research on physical activity app effectiveness were conducted with methodical limitations such as use of self-reported physical activity data and lack of randomized controlled trial design (Coughlin et al., 2016; Mateo et al., 2015).

◆ Purpose

- The purpose of this study was to verify the effectiveness of mobile apps for increasing physical activities, particularly walking behavior, by implementing randomized controlled trial design and with most commonly used apps recently.

◆ Methods

- **Participants** : A total of 50 college students
- **Experimental Design: Randomized Controlled Trial (RCT)**
 - All participants were randomly assigned to four groups
 - a) Experimental groups : Cashwalk(n=13), Fitmoney(n=12), Walker(n=15)
 - b) Control group(n=10)
- **Mobile applications used for experimental groups**
 - Inclusion criteria : the application (a) aimed to improve walking behavior, (b) with 10,000 + downloads (c) has three or more reinforcement system for walking behavior(except for reinforcement elements such as messages of encouragement or voice)
 - Exclusion criteria : the application (a) web-based/Internet-enabled apps only accessible via the mobile device's Web browser (b) which were only available in a non-Korean Language



Application	Cashwalk	Fitmoney	Walker
Type of reward system	Monetary reward	Social interaction with users	Game energy converted

• Measures

- Step counts : A self-developed application with built-in pedometer (ABC campus life) was used to measure the number of participant's daily step.

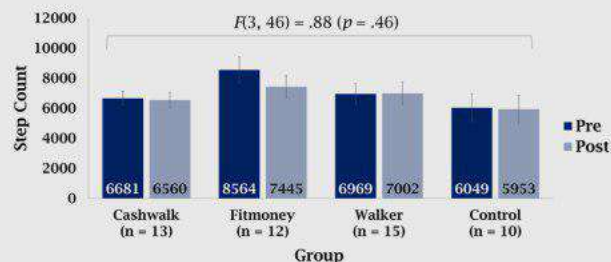
• Procedure

- After a week of baseline period, participants used assigned applications for 66 days.
- Three experimental groups used Cashwalk, Fitmoney, and Walker, according to their group condition. Control group used pedometer application which does not have additional function.

◆ Results

• Step count differences between groups

- Mixed repeated-measure ANOVA (Pre/Post x 4 groups)
- Pre-step counts differences between four groups was not statistically significant.



• Step count differences within individuals

- Bootstrapping analysis for comparison of confidence interval (Sampling = 100,000)
- After sampling step count data of each participants, the confidence intervals of mean step counts before and after using application were compared for each participants.
- The number of steps of all participants has either decreased or not changed.

Groups	Total N	Increase N (%)	No change N (%)	Decrease N (%)
Experimental				
Cashwalk	13	0(0)	13 (100)	0 (0)
Fitmoney	12	0(0)	11 (91.67)	1 (8.33)
Walker	15	0(0)	14 (93.33)	1 (6.67)
Control	10	0(0)	10 (100)	0 (0)

◆ Discussion

- This study tested effectiveness of mobile application on walking behavior with randomized controlled trial design, method known to be experimentally concrete.
- By using diverse analytical methods, this study gives evidence that apps commonly used in market these days do not promote walking behavior effectively. This result partially supports findings from meta-analysis of physical activity applications that effectiveness of apps last in short term only (Romeo et al., 2010).
- It was also found that types of reward system (monetary, social interaction, reward within app system), does not affect on effectiveness of apps.
- The results suggests the necessity of developing more effective physical activity application.

◆ References

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