



EFFECTIVENESS OF SMARTPHONE FITNESS APPLICATIONS IN PROMOTING PHYSICAL ACTIVITY AND HEALTH OUTCOMES AMONG UNDERGRADUATE STUDENTS

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ABSTRACT:

Smartphone fitness applications are increasingly used to promote physical activity and healthy behaviours among college students. This study evaluated the effectiveness of a 12-week smartphone fitness application intervention on self-regulation, physical activity, and health outcomes among undergraduate students at Elphinstone College Fort, Mumbai. Eighty students (17–22 years) were randomly assigned to an experimental group (n = 40) using a fitness application or a control group (n = 40) with no intervention. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ) and daily step counts, while health outcomes were assessed via BMI and resting heart rate. Structural equation modelling (SEM) revealed significant positive effects of app usage on self-regulation ($\beta = .45, p < .001$), physical activity ($\beta = .42, p < .001$), and health outcomes (BMI reduction $\beta = -.30, p < .01$; HR $\beta = -.28, p < .01$). These findings suggest that smartphone fitness applications are effective tools for promoting physical activity and improving health outcomes among college students.

Keywords: *Smartphone Fitness Apps, Physical Activity, Self-Regulation, Health Outcomes, SEM, College Students.*

INTRODUCTION:

Physical inactivity is a major global health concern, contributing to obesity, cardiovascular disease, and metabolic disorders. College students are particularly susceptible due to sedentary routines, prolonged screen time, and limited structured exercise opportunities (WHO, 2014).

During the **academic year 2014–2015**, smartphone fitness applications such as Google Fit, Nike Training Club, and MyFitnessPal were increasingly

adopted by students at Elphinstone College Fort. These applications provide self-monitoring, goal-setting, and feedback features to support behavior change.

This study investigates the impact of smartphone fitness applications on **self-regulation, physical activity, and health outcomes** using structural equation modelling (SEM).

LITERATURE REVIEW:

Before 2014, mobile technology was increasingly recognized as a promising tool for promoting physical activity and improving health outcomes. With growing smartphone ownership among young adults, researchers began exploring mobile-based interventions beyond traditional exercise programs. Early studies focused on text messaging, pedometers, and self-monitoring features, which showed positive effects on increasing physical activity levels and supporting weight management (Stephens & Allen, 2013; Fukuoka, Gay, Joiner, & Vittinghoff, 2012).

As smartphone applications evolved, research examined their ability to measure and influence physical activity. Bort-Roig et al. (2014) reported that smartphones could reliably track activity data and provide feedback, making them effective tools for behavior change. However, content analyses revealed limitations in commercial fitness apps. Middelweerd et al. (2014) and Direito et al. (2014) found that many apps lacked evidence-based behavior change techniques such as goal setting, personalized feedback, and social support, which are essential for sustained behavioral change.

Overall, pre-2014 literature suggests that smartphone fitness applications have strong potential to promote physical activity through monitoring and feedback mechanisms. However, their effectiveness depends largely on the integration of established behavior change strategies, and research specifically targeting undergraduate students remained limited during this period.

RESEARCH OBJECTIVES:

1. Examine the effect of smartphone fitness application usage on self-regulation.

2. Assess the impact on physical activity levels.
3. Evaluate improvements in health outcomes (BMI and resting heart rate).
4. Test a mediational model linking app usage → self-regulation → physical activity → health outcomes.

HYPOTHESES:

- **H1:** App usage increases self-regulation.
- **H2:** Increased self-regulation leads to higher physical activity.
- **H3:** Increased physical activity improves health outcomes (BMI, resting heart rate).

METHODOLOGY:

1. Research Design:

Randomized controlled trial with pre-test/post-test measurements analyzed using SEM.

2. Sample:

- N = 80 undergraduate students (17–22 years)
- Random assignment: Experimental group (n = 40), Control group (n = 40)

3. Instruments:

- **Physical Activity:** IPAQ Short Form, daily step counts via smartphone app
- **Self-Regulation:** Exercise Self-Regulation Questionnaire
- **Health Outcomes:** BMI (kg/m²), Resting Heart Rate (bpm)

4. Procedure:

- Pre-test measurements for all participants
- Experimental group: 12-week structured app intervention
- Control group: Routine lifestyle, no intervention
- Post-test measurements collected

5. Statistical Analysis:

- SEM using AMOS 24
- Fit indices: CFI \geq 0.90, TLI \geq 0.90, RMSEA \leq 0.08, SRMR \leq 0.08
- Significance threshold: $p < 0.05$

RESULTS:

Table 1: Participant Demographics

Variable	Experimental (n=40)	Control (n=40)	p-value
Age (years)	19.5 ± 1.2	19.3 ± 1.1	0.42
Male / Female	22 / 18	21 / 19	0.82
BMI (kg/m ²)	24.8 ± 3.2	24.5 ± 3.1	0.63
Baseline Step Count	5200 ± 820	5100 ± 790	0.54

Table 2: Pre- and Post-Test Outcomes

Variable	Pre-Test	Post-Test	t-value	p-value
Step Count	5200 ± 820	9100 ± 1100	6.82	<0.001
IPAQ MET Score	1850 ± 400	3200 ± 450	5.67	<0.001
BMI	24.8 ± 3.2	23.9 ± 3.0	2.45	0.018
Resting HR (bpm)	78 ± 6	72 ± 5	3.91	0.001

Table 3: Correlation Matrix

Variables	1	2	3
1. App Usage	1		
2. Self-Regulation	0.45**	1	
3. Physical Activity	0.42**	0.53**	1
4. Health Outcomes (BMI)	-0.30*	-0.32*	-0.50**

p < 0.05, ** p < 0.01

DISCUSSION:

Smartphone fitness apps significantly improved **self-regulation, physical activity, and health outcomes** among students at Elphinstone College Fort. This aligns with prior research (Direito et al., Fanning et al., Silva et al.). It supports integrating **app-based interventions** into Indian colleges to improve student wellness.

CONCLUSION:

Smartphone fitness applications are effective tools for enhancing self-regulation, physical activity, and health outcomes in undergraduate students during 2014–2015. Colleges like Elphinstone College Fort can implement app-based interventions.

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