

Conference Paper

Effectiveness of Exercise App with Self-Efficacy to Achieve Recommended Levels of Physical Activity among Adult: A Systematic Review

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Abstract

Background: Inactive physical activity among university students remains public health concern due to significant adverse effects and its high prevalence. Transmission from adolescence to adulthood considered as a critical period for lowered their physical activity. Evidences suggested that either self-efficacy-driven intervention or applied exercise App could promote the level of physical activity. However, have examined the effect of exercise App with self-efficacy intervention to promote recommended level of physical activity among university students. **Objective:** It was recognized the effects of exercise App with self-efficacy to achieve recommended levels of physical activity among university students by systematic review. **Methods:** A systematic review was conducted to search the English publications in the databases of PubMed, Cochrane Library, MEDLINE, and CINAHL, in a period of during 2008 to 2018. Inclusive criteria were the publications using exercise App with self-efficacy programs and the participants in the age from 18 to 64 years old and healthy people. Excluded criteria were if research recruited participants with chronic diseases, mental diseases, pregnant women, and disability in the study. Finally, 319 articles were searched. After two reviewers used CASP checklist to evaluate study quality, the findings were extracted from 4 qualified articles. **Results:** The results of systematic review show that most of the studies were conducted in the USA and using Apps as strategies to design basing on SE to increase physical activity. Regarding as how using App for self-monitoring that combine with SE to design in the interventions, the strategies included merging in class sessions to implement the program, goal setting, advice and counseling from health care provider and telephone, problem solving training, using website, self-efficacy coaching, and health provider visit plus telephone. All studies results show that a significant effectiveness using Apps combine SE to applying in program could promote participants achieving recommended levels of PA. **Conclusions:** This systematic review provides an evidence base if the program with exercise App and self-efficacy to design it has higher effectiveness on achieving recommended levels of PA. SE is valuable to use in PA programs for adults in future studies.

Keywords: App exercise, self-efficacy exercise, physical activity, university students, a systematic review

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Received: 22 September 2019

Accepted: 4 October 2019

Published: 10 October 2019

Publishing services provided by
Knowledge E

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Selection and Peer-review under
the responsibility of the ICHT
2019 Conference Committee.

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1. Introduction

Evidence have been well-documented the benefit of Physical activity (PA) on health and psychological well-being [1]. Previous studies suggested that university student was a key important population to gain more short- and long-term benefit of PA [2, 3]. However, about 66.9% to 91% of university student were reported physical inactive at European countries, Australian, Asia-Pacific, and the United States. A negative adverse effects associated with low PA among university students were reported including increased body weight, stress and anxiety, elevated cardiovascular risk, and low academic performance [4,5,6,7]. Therefore, promoting PA with specific approach remains public health attention.

The transition from adolescence to adulthood considered as a critical period for lowered their physical activity among university students. During this transition, number of stressors such as change of residence, increased responsibility, peer pressure, course work management, and difficult schedules become main reason for physical inactive. WHO was recommended to do PA for adult as at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity for a week or an equivalent combination of moderate- and vigorous-intensity activity. Considering above situation, incorporate PA in to their university students' lifestyle is one of key strategies to enhance their PA level.

With advancing technology, many innovations have been designed to help people easily self-monitoring their PA. Smartphone technology and mobile applications have shown promising results in physical activity and health promotion [8]. Of the 875,683 active Apps available in iTunes and the 696,527 active Apps in Google Play, 23,490 and 17,756 were categorized as health and fitness. Evidence showed that pedometer, stoplog, web-based, and text messaging were effective to promote PA (about 10000 steps per day), reductions in body mass and blood pressure [9]. However, the effectiveness of this App on increased level of PA and other exercise outcome less tested, particularly among university students.

Previous studies have documented the effectiveness of intervention driven-theory to promote PA level [12,13,14]. Theories are recommended to help understand why individuals are, or are not, engaging in health-promoting behaviors, to determine what factors to target within interventions, and to determine how to design intervention strategies to influence health behaviors [15]. One of the famous theory commonly used in the PA is social cognitive theory which self-efficacy as a main construct [16]. Self-efficacy is defined as the public's belief about their ability to produce a designated performance level having an influence over events affecting their lives [16]. Numerous

studies have shown that self-efficacy are related to PA across a wider variety of setting and population and mediated PA change in the intervention. Thus, using exercise App applied theory-based techniques would produce promising results on attaining recommended level of PA among university students.

2. Methods

This study was conducted using a systematic review to evaluate effectiveness of exercise app with self-efficacy to achieve recommended levels of physical activity among university students.

2.1. Search strategy

The search strategy aims was to find published studies. An initial limited search of PubMed, Cochrane Library, MEDLINE, CINAHL, and PsycInfo in a period of during 2008 to 2018. In the searching sources process was utilize the Mesh term, determine the keywords based on the PICO component. The keywords used in this review are “University Students OR College Students OR Adults” AND Smartphone OR mobile phone OR Mobile device OR tablet OR iPhone OR mobile technology OR Smart Phone OR iPad OR miHealth OR android OR windows AND “Self-Efficacy OR behavior OR behavior” AND “Physical Activity OR Exercise OR Aerobic Exercise OR Physical Exercise OR Physical Fitness OR Fitness”.

2.2. Inclusion and Exclusion Criteria

Eligible participants are: Over 18 years old, publications using SE programs, Apps programs, outcoe publications is physical activity, published in last 10 years and the type of study included randomized controlled trials, systematic review and qualitative study. Research recruited participants with chronic diseases, mental diseases, pregnant women and disability in the study will be exclude.

2.3. Data extraction

Data were extracted by the reviewers and summarized by using the Critical Appraisal Skills Programme (CASP) and PRISMA tools. Collected data includes participant demographics, sample inclusion and exclusion criteria, study setting, number and reasons

for withdrawal from study, type and description of complementary therapy intervention, application and follow up of intervention, measure of outcomes, statistical methods and study outcome descriptions.

2.4. Assessment of methodological quality

Methodological validity was processed by Appraisal instrument from Critical Appraisal Skills Programme (CASP) and PRISMA tools. All papers selected for inclusion were subjected to a rigorous, independent appraisal to identify and select papers of the highest quality except those that minimize bias and have good validity and precision. Expert opinion based on bench research or consensus.

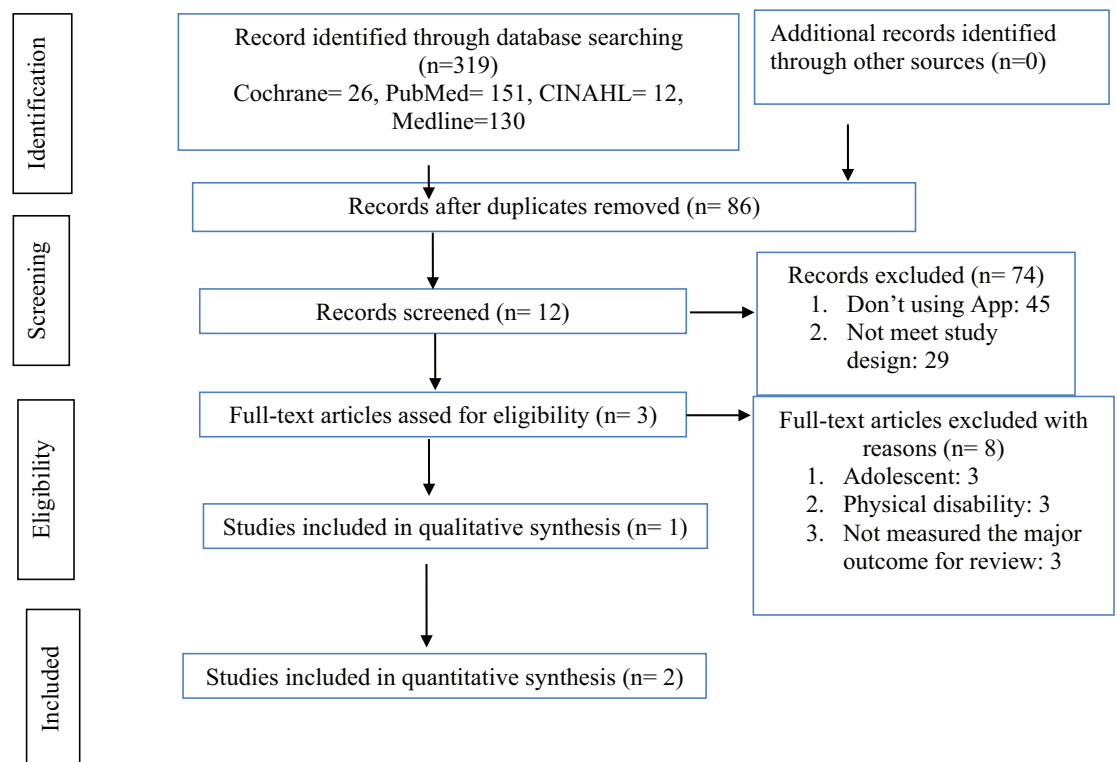


Figure 1: Flow diagram of systematic search.

3. Results

The literature searches (see Figure 1) generated 319 studies through searches of databases, excluding duplicates. From above number, we excluded the studies that were incompatible with inclusion criteria. Don't using App (74), and not meet study design (29). For total reviewed the full text of the remaining 8 articles. Of these, will not be considered for review 3 studies were not measured the major outcome, adolescent

3 studies and physical disability 3 studies. Finally, I decided 3 studies (one qualitative study, one RCT and one is systematic review) which have key strengths in design and measure important outcome to evaluate physical activity to be reviewed.

4. Discussion

Research on the effectiveness of exercise App with self-efficacy to achieve recommended levels of physical activity reported the evidence of the benefit of exercise App in helping adult and increase physical activity. Review about effectiveness of exercise App of one randomized control study, one quantitative study and one systematic review that provided levels of physical activity in adult population. Most of the studies were conducted in the United Kingdom, demographic data range of age: 18 – 40 years old, gender: male more than female, duration intervention 8- 24 weeks and design in the interventions, the strategies included merging in class sessions to implement the program, goal setting, advice and counseling from health care provider and telephone, email, training, using website, and self-efficacy coaching. However, the result from this systematic review showed using exercise App effective to with SE applying in program could promote participants achieving recommended levels of PA and the other finding that exercise App also control increased body weight, change BMI and change blood pleasure.

5. Conclusion

This systematic review provides an evidence base if the program with exercise App and self-efficacy to design it has higher effectiveness on achieving recommended levels of PA. SE is valuable to use in PA programs for adult's population in future studies.

Acknowledgement

The authors would like to thank their colleague for their contribution and support to the research. They are also thankful to all the reviewers who gave their valuable inputs to the manuscript and helped in completing the paper.

Conflict of Interest

The authors have no conflict of interest to declare.

TABLE 1: Results of synthesis.

Study	Design and Samples	Purposes	Interventions	Measurements	Outcomes	Conclusion
Harries, T., et al, 2016. United Kingdom	RCT Healthy male participants, aged 18–40 years old Case: 103 Controls: 49 Total: 152 participants	To evaluate the effectiveness of using smartphones to promote physical activity in primary care. H1 – receipt of social feedback generates higher step-counts than receipt of no feedback H2 – Individual feedback H3 – social and individual feedback	8 weeks 1. Text messages were sent to participants. 2. In weeks 1–2, four messages reminded all participants. 3. In week 3, those in the treatment groups received messages on the Monday. All three groups were sent a message on the Thursday. 4. Two experimental groups were sent weekly messages to encourage them to walk more and those in the control group were messaged once a fortnight to remind them to carry their phones	Using the Active App and Physical Activity Readiness Questionnaire	The difference between the two feedback groups (individual vs. social feedback) was not statistically significant. 1. Compared to the control, the expected step-count for the individual feedback group was 60% higher (effect on log step-count = 0.474, 95% CI = 0.166–0.782) and that for the social feedback group, 69% higher (effect on log step-count = 0.526, 95% CI = 0.212–0.840)	Smartphone apps that provide step-counts can increase physical activity in young to early-middle-aged men but the provision of social feedback has no apparent incremental impact
Casey, M., et al, 2014, Ireland.	Qualitative study Primary Care Team; staff of the Discipline of General Practice at the National University of Ireland Total: 12 participants	To explore experiences of using smartphones to promote physical activity in primary care.	1. Examine factors that promote and inhibit the effectiveness of smartphones in the promotion of physical activity. 2. Explore the views and experiences of participants who use this technology	Using Interview topic guide with 22 questions: 1. Questions 1–14 were used for both control and intervention participants 2. Questions 15–23 were used specifically for participants who had used the smartphone application (app)	The app appeared to facilitate a sequential and synergistic process of positive change, which occurred in the relationship between the participants and their exercise behavior.	Notwithstanding technological challenges, an app has the potential to positively transform, in a unique way, participants' relationships with exercise. Such interventions can also have an associated cascade effect within their wider families and communities

TABLE 1: Continued.

Study	Design and Samples	Purposes	Interventions	Measurements	Outcomes	Conclusion
Bravata et al, 2007 20 United States or Canada, 2: Japan, 2 : Europe, and 2 Australia.	Systematic review 26 studies with a total of 2767 participants (8 randomized controlled trials [RCTs] and 18 observational Studies).	To evaluate the association between pedometer with physical activity and health outcomes among adults	Duration18 – 24 weeks 1. Intervention using pedometers (record their daily step counts). 2. Given booklet about the program and walking; received encouraging e-mails each week. 3. Class discussion.	Using pedometer	a. Observational Study Results: Pedometer users significantly increased their physical activity by 2183 steps per day over baseline (95% CI, 1571-2796 steps per day, P =.001). b. Intervention participants significantly increased their physical activity by 2491 steps per day more than the 122 control participants (95% confidence interval [CI], 1098-3885 steps per day, P =.001) c. Change in BMI: intervention participants significantly decreased their BMI by 0.38 from baseline (P =.03). d. Change in Blood Pressure: Intervention participants significantly decreased their systolic blood pressure by 3.8 mm Hg (P =.001) and their diastolic blood pressure by 0.3 mm Hg (P =.001).	Use pedometer is associated with significant increases in physical activity and significant decreases in body mass index and Blood pressure.

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