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Review Paper

Do E-health interventions improve physical activity in young people: a systematic review



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ARTICLE INFO

Article history:

Received 11 August 2016

Received in revised form

30 January 2017

Accepted 1 April 2017

Available online 6 May 2017

Keywords:

E-health

Intervention

Physical activity

Young people

Web-based

Students

Adolescents

ABSTRACT

Objectives: This study aims to review the current literature to assess the effectiveness of E-health interventions in increasing physical activity (PA) in young people.

Study design: This study is a systematic review of the literature.

Methods: A search of the literature databases Embase, MEDLINE and the Cochrane Library using key words ‘Adolescents’; ‘Young people’; ‘Students’; ‘Young Adults’; ‘Teenagers’; ‘E-health’; ‘Internet-based’; ‘Web-based’; ‘Exercise’; ‘Activity’; ‘Sport’ and ‘Intervention’ yielded 10 articles which fit the criteria for inclusion. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol was used, and papers were excluded if they were disease focused, not specific to young people (those attending school, college or university) or did not measure PA as an outcome.

Results: Eight of the 10 studies had significant increases in PA as a result of an E-health intervention. Studies that did not use a theoretical principle to underpin their intervention did not achieve successful results. Interventions based on social cognitive theory were very successful in achieving an increase in PA. The theory of planned behaviour had mixed results, with studies having contrasting results. Specific, measurable, achievable, relevant and time-bound (SMART) goal principle was not effective in increasing PA but had positive findings in supplementary outcomes such as goal setting.

Conclusions: E-health interventions are a very successful way to increase PA. More research is required to look at what theoretical principles are best to underpin interventions and also to assess the length of intervention required for optimal results after intervention. Ideas surrounding implementation and the mediums used require more studies to evidence base these interventions for schools, colleges and university via intracurriculum or extracurriculum.

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Introduction

The lack of physical activity (PA) is an important contributor to morbidity and mortality globally, contributing to one in six

deaths worldwide.¹ Adolescence is an important period of time when exercise behaviours and habits are cemented.² Two systematic reviews prior to 2010 concluded that studies required more rigorous methods and evaluation to further

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<http://dx.doi.org/10.1016/j.puhe.2017.04.001>

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evidence the effects of E-health interventions.^{3,4} It is therefore prudent to continue this research by considering how we can approach young people to instil healthy values into their day-to-day activities.

E-health interventions are becoming an increasingly popular method for delivering public health programmes and would seem particularly appropriate for engaging young people who are digital natives. The multiple benefits of E-health include cost, efficiency, knowledge, travel and communication.⁵ There are however unforeseen consequences associated with E-health interventions. Medical professionals should critically analyse any E-health intervention and its implementation to avoid exacerbating issues surrounding the increasing difficulties of interpersonal care.⁶

The increasing burden of non-communicable disease worldwide is an epidemic which will not reduce without a considered methodological approach to changing cultural choices and norms. E-health interventions are potentially important tools with the capacity to reach a large proportion of the population rapidly. Prevention of conditions caused by lack of PA has become an integral part of current advances in technology and E-health.

This review includes the following modes of E-health: web-based including online applications, webinars, websites and e-communications. This systematic review aims to assess the effectiveness of E-health interventions for increasing PA levels in young people.

Methodology

This review was registered prospectively to the PROSPERO register. Registration number CRD42016039058.

Data sources

A structured systematic literature search was performed in July 2016 in MEDLINE, Embase and the Cochrane Library databases using the following key words: 'Adolescents'; 'Young people'; 'Students'; 'Young Adults'; 'Teenagers'; 'E-health'; 'Internet-based'; 'Web-based'; 'Exercise'; 'Activity'; 'Sport' and 'Intervention'. This was an open search conducted to review novel E-health interventions. Literature published since 2010 were searched.

Study selection

This study follows the PRISMA protocol guidelines, and the PRISMA flow chart is shown in Fig. 1. The search of the databases and the exclusion/inclusion of relevant studies based on title alone were done by the first author (JM). The full text of the remaining studies was reviewed by JM and a second reviewer (PW). Discrepancies were then agreed by consensus discussion led by a third author (SJ). All studies which met the inclusion criteria were included in the systematic review (Table 1). Data were extracted by two authors independently (JM and PW) and assessed by a fourth reviewer (NH) to ensure accuracy and consistency.

Types of study

Study designs of all types were included if the criteria of inclusion were met. The study aims to include all research currently available for review to best inform results. Studies were limited to articles written in English.

Quality assessment of included studies

An adapted assessment tool based on the 'critical appraisal for public health checklist' has been used to give a numerical quality score for each included study (Table 1).⁷

Types of participant

Studies included were not disease focused. Studies had to represent young people. Studies were only included if the participants were students attending school, college or university. The type of intervention, underpinning theories, PA outcomes and measures were extracted by JM and PW.

Types of intervention

For inclusion, studies had to include a web-based or E-health intervention. Interventions not based on E-health technology were excluded.

Outcomes

Included studies measured the effects of the intervention on PA levels as a primary or secondary outcome.

Results

Eighteen articles were identified for full review. Ten studies with a total of 5352 participants met the inclusion criteria. Of these, six are randomised control trials,^{8–13} three are before and after quasi-experimental designs^{14–16} and one is a cluster randomised trial.¹⁷

Interventions

Most of the interventions incorporated theoretical principles (9/10). Five studies used social cognitive theories (SCTs) to underpin their interventions, of which three used SCT as the sole foundation of their intervention.^{8,11,14} SCT is the ideology that individuals do not just learn by their own experience but also from observing others.¹⁸ It is based on four theoretical components: modelling, outcome expectancies, self-efficacy and identification. One study combined SCT with 'the health belief model'.¹⁰ This is a theoretical framework explaining and predicting health-related behaviours, principally the uptake of health services.¹⁹ It is embedded in similar theoretical foundations to SCT but adds key doctrines such as cues to action, perceived beliefs, barriers, susceptibility and severity. SCT was also combined with two other theoretical principles: the theory of planned behaviour (TPB) and the 'attitude, social influence and self-efficacy model'.¹⁶ Two more studies also

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