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Review

The effects of school-based physical activity interventions on students' health-related fitness knowledge: A systematic review

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ABSTRACT

This systematic review includes 34 studies examining the effects of school-based physical activity interventions on students' health-related fitness knowledge. The study design, methodological quality, and effectiveness of interventions on students' health-related fitness knowledge were analysed. The majority of the studies (79.4%) revealed significant positive intervention effects on students' health-related fitness knowledge. Studies examining adolescents were more frequently in a position to influence students' health-related fitness knowledge (87.5%) than studies examining children (75%), and studies with low methodological quality (88.8%) had more frequent positive effects than studies with moderate quality (75%). The effects on students' health-related fitness knowledge were independent of moderator variables such as the intervention content, duration and frequency. Only few studies were able to simultaneously positively influence students' health-related fitness knowledge and students' physical activity and/or fitness levels. These programmes can positively influence students' health-related fitness knowledge, but it remains unclear what the practical significance of these changes is. Further research is needed to clarify the influence of students' health-related fitness knowledge on reflection, understanding, physical activity behaviour, and overall physical literacy levels.

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1. Introduction

Although it is widely known that a physically active lifestyle can contribute to the prevention of chronic diseases (Schneider & Becker, 2005), a high percentage of people in industrialised countries lead a sedentary lifestyle (Bize, Johnson, & Plotnikoff, 2007). Consequences are chronic diseases, such as cardiovascular diseases, obesity, type II diabetes, hypertension, colon and breast cancers, depression, and backaches. These diseases represent a major cost factor for the health care system in modern society (Cecchini et al., 2010). According to the HBSC survey, a sedentary lifestyle is already observable at a young age, particularly in girls. Furthermore, physical activity levels decrease with age, with about only 16% of the 15-year-olds fulfilling the physical activity recommendations (Currie et al., 2004). Therefore, it is evident that a successful health intervention programme must be initiated at an early age, continued and repeated over time (Villard, Ryden, Ohrvik, & Stahle, 2007). In this regard, knowledge is considered an important prerequisite of changing the behaviour of children and adolescents (Lloyd, Colley, & Tremblay, 2010). However, although the need to promote an active lifestyle from a young age is shown in the attempts of government agencies, communities, and scientists to implement suitable physical activity programmes (Cale & Harris, 2005), systematic information on the effects of intervention programmes on students' knowledge do not exist.

The necessity of providing students with appropriate knowledge, skills and attitudes to lead physically active lifestyles is a central topic in the *didactic discussion in the PE curricula*. In the United States, the National Association for Sport and Physical Education identified four national standards for physical education: motor skill competency, knowledge, physical activity and physical fitness (Erwin & Castelli, 2008). These standards are in line with traditional physical education curricula around the world. The American Academy of Paediatrics emphasises that physical activity should "help students to develop knowledge, attitudes, motor skills, behavioural skills and confidence needed to adopt and maintain physically active lifestyles" (Committee on Sports Medicine and Fitness and Committee on School Health, 2000). The English National Curriculum for Physical Education (NCPE) in the UK also states that health-related exercise should enhance students' knowledge, understanding, skills and awareness of physical activity and exercise and should be delivered within physical education lessons from ages five to 16 years (Fairclough, Stratton, & Butcher, 2008).

Knowledge plays a crucial role in recent concepts of *physical literacy* that capture the essence of what a quality physical education aims to achieve (Lloyd et al., 2010; United Nations Educational Scientific and Cultural Organization (UNESCO), 2015). Several models have been developed that try to describe the construct of physical literacy. Whitehead (2010) defines physical literacy as the "the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the lifecourse". Based on Lloyd et al. (2010), physical literacy comprises specific skills that can be operationalised in four inter-related core domains (Lloyd et al., 2010): a) physical fitness (cardio-respiratory, muscular strength and flexibility), b) motor behaviour (fundamental motor skill proficiency), c) physical activity behaviours (directly measured daily activity), and d) psycho-social/cognitive factors (attitudes, knowledge, and feelings). Being physically literate is conceived to be the result of the integrated interaction of these domains to facilitate lifelong healthy physical activity behaviours (Lloyd et al., 2010). Overall, physical literacy is a basic requirement to receive life-long benefits of physical activity and sport. Against the background of the concept of physical literacy, it becomes clear that the transportation of knowledge is one essential task of physical education and this holds particularly true regarding health promotion and illness prevention.

In the concept of physical literacy, it is emphasized that the interaction between its four domains is essential for an active lifestyle. Nevertheless, in the literature the actual association between knowledge and physical activity behaviour is discussed controversially. On the one hand, lack of knowledge is believed to be one of the main factors causing insufficient physical activity (Keating et al., 2009), and Bandura (1997) even argues that it is unlikely that people will put themselves through the drudgery of changing bad health habits they enjoy if they lack knowledge of how some lifestyle habits affect their health. On the other hand, investigators conclude based on empirical evidence that knowledge is necessary but not sufficient to change behaviours and other researchers even stress that knowledge has been consistently shown to be non-influential in predicting behaviour (Ajzen, Joyce, Sheikh, & Cote, 2011; Fisher & Fisher, 1992; Jerusalem, 2006). It is believed that in addition to having the required knowledge, it is necessary to be motivated to perform the behaviour in question. Based on the information-motivation-behavioral skills model (Fisher, Fisher, & Harman, 2003; Fisher, Fisher, Williams, & Malloy, 1994), knowledge and motivation jointly influence behaviour, either directly or indirectly via their effects on behavioural skills. While knowledge per se is probably not enough to change behaviours (Ennis, 2007; Placek et al., 2001), improving and developing mastery of health-related fitness knowledge might be the first step towards the establishment of healthy PA behaviours (Keating, 2003; Nahas, 1992).

In this paper, we focus on the specific aspect of *knowledge within the concept of physical literacy*. Up to now, a clear definition and operationalisation of the term knowledge (and understanding) as it is used in the concept of physical literacy does not exist. Nevertheless, when focusing on the enhancement of students' physical literacy from a health perspective, it is important to define what type of knowledge children and adolescents should possess in order to develop a healthy lifestyle.

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