



ORIGINAL ARTICLE

Screen time impairs the relationship between physical fitness and academic attainment in children[☆]



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KEYWORDS

Academic performance;
Cardiorespiratory fitness;
Muscular strength;
Sedentary lifestyle

Abstract

Objective: The purpose of this study was twofold: to analyze the association between physical fitness and academic attainment, and to determine the influence of screen time on the association between physical fitness and academic attainment.

Methods: A cross-sectional study including 395 schoolchildren from seven schools of the Maule Region, Chile (mean age 12.1 years; 50.4% boys) participated in the autumn of 2014 (March to June). Self-reported physical activity and screen time were evaluated. The study measured academic achievement (mean of the grades obtained in several core subjects), physical fitness (cardiorespiratory fitness and muscular strength), weight, height, parental education, and socioeconomic status. Linear regression analysis was used to analyze the relationships between physical fitness and academic attainment after adjusting for potential confounders by gender. Analysis of variance was used to analyze the differences in academic attainment according to fitness and screen time categories (< 2 hours/day and \geq 2 hours/day).

Results: In both genders good cardiorespiratory fitness levels were associated with high language ($\beta=0.272-0.153$) and mean academic attainment ($\beta=0.192-0.156$) grades; however, after adjusting for screen time and other potential confounders, these associations disappear. Similarly, no relationship was observed after analyzing those children who spend more hours of screen time (\geq 2 hours/day).

Conclusions: Academic attainment is associated with higher cardiorespiratory fitness levels; however, it was weakly impaired by screen time. These findings seem to suggest that parents and policymakers should minimize the negative effects of screen time on children's lives to maximize the beneficial effect of healthy habits on academic attainment.

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PALAVRAS-CHAVE

Desempenho acadêmico;
Aptidão cardiorrespiratória;
Força muscular;
Estilo de vida sedentário

O tempo de tela prejudica a relação entre a forma física e o sucesso acadêmico em crianças**Resumo**

Objetivo: O objetivo deste estudo foi duplo: analisar a relação entre a forma física e o sucesso acadêmico e determinar a influência do tempo de tela sobre a relação entre a forma física e o sucesso acadêmico.

Método: Um estudo transversal incluindo 395 crianças em idade escolar de sete escolas da região de Maule, Chile (com idade média de 12,1 anos; 50,4% de meninos), foi realizado no outono de 2014 (março a junho). A atividade física e o tempo de tela autorrelatados foram avaliados. Mensuramos o desempenho escolar (média das notas obtidas em diversas matérias principais), a forma física (aptidão cardiorrespiratória e força muscular), o peso, a estatura, a escolaridade dos pais e a condição socioeconômica. A análise de regressão linear foi usada para avaliar as relações entre a forma física e o sucesso acadêmico após o ajuste pelas possíveis variáveis de confusão por sexo. A análise de variância foi usada para avaliar as diferenças no sucesso escolar de acordo com as categorias de forma física e tempo de tela (< 2 horas/dia e \geq 2 horas/dia).

Resultados: Em ambos os sexos, os bons níveis de aptidão cardiorrespiratória foram associados às maiores notas em línguas ($\beta = 0,272-0,153$) e à média de sucesso acadêmico ($\beta = 0,192-0,156$); contudo, após ajustar o tempo de tela e outras possíveis variáveis de confusão, essas associações desaparecem. Da mesma forma, não foi observada nenhuma relação após analisar as crianças com mais horas de tempo de tela (\geq 2 horas/dia).

Conclusões: O sucesso acadêmico está associado a maiores níveis de aptidão cardiorrespiratória; contudo, foi pouco prejudicado pelo tempo de tela. Esses achados parecem sugerir que os pais e órgãos reguladores devem minimizar os efeitos negativos do tempo de tela sobre as vidas das crianças para maximizar o efeito benéfico de hábitos saudáveis sobre o sucesso acadêmico.

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Introduction

Electronic media use is a common pastime for children today and has led to negative health effects in children and adolescents.¹ These effects include less time for physical activity,² poorer academic performance,³ higher risk of overweight,⁴ and low levels of physical fitness,⁵ *inter alia*. Therefore, strategies aimed to reduce screen time in this population have started to emerge.⁶ For example, the World Health Organization goal has been to increase the proportion of adolescents who view television two or fewer hours on a school day.⁷

According to previous studies, higher levels of physical fitness^{8,9} and physical activity (PA)¹⁰ are related to enhanced overall health¹¹ and are also associated with higher academic attainment. However, the evidence from several studies concerning the association between physical fitness and academic attainment remains weak, due principally to lack of control for important confounders.¹² Because screen time is a significant predictor of academic attainment² and high screen-time during childhood is an independent predictor of lower cardiorespiratory fitness in youth,^{13,14} it appears important to examine the mediating effect that screen time may have on the association between physical fitness and academic attainment. To the authors' knowledge, no study has attempted to answer this question. Therefore, the purpose of this study was twofold: to analyze the association of

physical fitness and academic attainment, and to determine the influence of screen time on the association between physical fitness and academic attainment.

Methods**Participants**

All the seventh-grade primary schoolchildren from seven schools in the Maule region (Chile) were invited to participate, and 395 (87%) accepted. They attended public, partially subsidized, and private schools from rural areas. The sample was selected for convenience. Subjects were excluded if they had special education needs or any type of dysfunction limiting their physical activity. The study protocol was approved by the Ethics Committee of the Autonomous University of Chile and subsequently by the director of each school. Following this approval, a letter was sent to parents of all children in the seventh grade, inviting them to a meeting where the objectives of the study were outlined, and written informed consent for the participation of their children in the study was obtained. After all signed forms were collected, researchers met with the physical education teacher to obtain autumn 2014 data (March to June).

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