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Relationship of weight status, physical activity and screen time with academic achievement in adolescents

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Summary

Objective: The aim of this study was to examine the relationship of weight status, physical activity and screen time with academic achievement in Chilean adolescents. **Methods:** The present cross-sectional study included 395 adolescents. The *International Obesity Task Force* cut-off points were used to define the weight status. Physical activity was assessed using the *Physical Activity Questionnaire for Adolescents* and screen time was assessed using several questions about television, videogame and computer use. Academic achievement was measured using the mean of the grades obtained in mathematics and language subjects.

Results: In both genders, adolescents with obesity and excessive screen time earned worse grades compared to their non-obese peers and their peers that complied with screen time recommendations. The logistic regression analysis showed that adolescents with obesity, classified with medium–low physical activity and excessive screen time recommendations (excess ≥ 2 h/day) are less likely to obtain high academic achievement (boys: OR = 0.26; girls: OR = 0.23) compared to their non-obese peers, high levels of physical activity and those who comply with the current screen time recommendations. Similar results were observed in adolescents with obesity and classified with medium–low physical activity (boys: OR = 0.46; girls: OR = 0.33) or excessive screen time (boys: OR = 0.35; girls: OR = 0.36) compared to adolescents with high levels of physical activity and those who complied with the screen time recommendations, respectively.

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Conclusion: This study shows that when combined, obesity, low–medium levels of physical activity and excessive screen time might be related to poor academic achievement.

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Introduction

Chile has experienced a significant increase in obesity and its comorbidities, resulting from a nutritional and epidemiological transition. This transition has driven people to eat unhealthy foods and include daily sedentary behaviours such as screen time [1]. Also, the Chilean Ministry of Health (2009–2010) determined that 89% of the Chilean population is physically inactive during their leisure time [2]. In the school-age population this physical inactivity was also apparent, with only 10% of children regularly engaged in more than 4 h of physical activity per week [3].

The influence of obesity, low physical activity and sedentary behaviour on people's health is well known. However, little is known about whether these factors are associated with levels of academic achievement. These relationships could be in either direction, or they could even be bi-directional. Several studies have reported negative associations between obesity and academic achievement [4–6]. A physically active lifestyle could have benefits on academic achievement in children and adolescents [7], but studies have found inconsistent results [8,9]. Regarding elevated screen time, including television use, videogames and Internet use, all appear detrimentally associated with school performance [10].

Although several studies have found relationships between these factors and academic achievement, to date only one study has examined the combination of these [4]. This cross-sectional study showed that cardiorespiratory fitness and weight status, both independently and combined, were related to academic achievement in seventh grade students, independent of the different cohorts, providing further support for the view that aerobically fit and lean students are more likely to have better performance at school. Therefore, it seems justified to further investigate the associations between combinations of these factors and academic achievement. Thus, the aim of this study

was to examine the relationship of weight status, physical activity and screen time with academic achievement in Chilean adolescents.

Methods

Subjects

All the seventh-grade primary schoolchildren from seven schools in the Maule region (Chile) were invited to participate. A total of 454 adolescents were invited and 87% agreed to participate in the study ($n=395$). The adolescents attended public, partially subsidised, and private schools from rural areas. Adolescents were excluded if they: had special education needs (learning difficulties and/or learning disabilities) or had any type of dysfunction limiting their physical activity (any disease or problem). Physical education teachers provided this information. The study protocol was approved by the Autonomous University of Chile Ethics Committee and by the director of each school, and followed the principles of the Declaration of Helsinki. Following this approval, we sent a letter to parents of all adolescents in the seventh grade, inviting them to a meeting where we outlined the objectives of the study and obtained written consent for the participation of their adolescents in the study.

Weight status

Participants were weighed while wearing light clothing and height was measured without shoes, using a wall-mounted stadiometer. These measurements were used to calculate the body mass index (BMI), which was computed as the weight in kilograms divided by the square of the height in meters (kg/m^2). Finally, adolescents were classified as either non-obese (normal weight/overweight) or obese based on the *International Obesity Task Force* age- and gender-specific BMI cut-off points [11].

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