



ORIGINAL ARTICLE

Association between nutritional status and physical abilities in children aged 6–18 years in Medellín (Colombia)[☆]



A. García Cruz^{a,b}, J. Figueroa Suárez^c, J. Osorio Ciro^{a,b}, N. Rodríguez Chavarro^{a,b}, J. Gallo Villegas^{a,b,d,*}

^a Facultad de Medicina, Universidad de Antioquia, Medellín, Colombia

^b Grupo de Investigación en Medicina Aplicada a la Actividad Física y el Deporte (GRINMADE), Facultad de Medicina, Universidad de Antioquia, Medellín, Colombia

^c Universidad de Santander, Bucaramanga, Colombia

^d Centro Clínico y de Investigación SICOR, Soluciones Integrales en Riesgo Cardiovascular, Medellín, Colombia

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KEYWORDS

Physical fitness;
Nutritional status;
Sexual maturation;
Under-nutrition;
Obesity

Abstract

Introduction: Nutritional disorders in childhood may cause a decline in motor abilities and increased morbidity and mortality in adulthood.

Objective: To assess the association between nutritional status and motor abilities.

Materials and methods: A cross-sectional study was performed that included 12,872 children aged between 6 and 18 years who underwent a clinical evaluation and various physical tests.

Results: Among the children, 66% had a Tanner maturation stage 1 and 2, 6% were under-nourished, and 12.2% were at risk of overweight and obesity. The obese children had a decrease in aerobic power (in $2.72 \text{ mlO}_2 \text{ kg}^{-1} \text{ min}^{-1}$; 95% CI: 1.89–3.56; $P < .001$), speed (0.14 m/s; 95% CI: 0.06–0.22; $P < .001$), explosive strength (0.10 m; 95% CI: 0.06–0.13; $P < .001$), agility, strength endurance and balance. Under-nourished children showed a decrease in speed (0.13 m/s; 95% CI: 0.06–0.20; $P < .001$), explosive strength (0.04 m; 95% CI: 0.01–0.07; $P < .004$), and strength endurance.

Conclusions: There was an association between nutritional status and motor abilities in the children included in this study. Obese children showed the worst results in physical tests, and the under-nourished ones showed a decrease in speed, explosive strength and strength endurance.

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* Corresponding author.

E-mail address: jagallo2000@yahoo.com (J. Gallo Villegas).

PALABRAS CLAVE

Capacidad física;
Estado nutricional;
Maduración sexual;
Desnutrición;
Obesidad

Asociación entre el estado nutricional y las capacidades físicas en niños de 6 a 18 años de Medellín (Colombia)

Resumen

Introducción: Las alteraciones nutricionales en la niñez pueden producir un deterioro en las capacidades físicas y una mayor morbimortalidad en la vida adulta.

Objetivo: Evaluar la asociación entre el estado nutricional y las capacidades físicas

Materiales y métodos: Estudio transversal que incluyó 12.872 niños, con edades entre 6 y 18 años, a quienes se les realizó una evaluación clínica y diferentes pruebas físicas.

Resultados: Entre los niños incluidos, el 66% tenían un estadio de maduración Tanner 1 y 2, el 6% presentó desnutrición y 12,2% estaban en riesgo de sobrepeso y obesidad. Los niños con obesidad presentaron una disminución en la potencia aeróbica (en 2,72 ml O₂ kg⁻¹ min⁻¹; IC 95%: 1,89-3,56; p < 0,001), velocidad (0,14 m/s; IC 95%: 0,06-0,22; p < 0,001), fuerza explosiva (0,10 m; IC 95%: 0,06-0,13; p < 0,001), agilidad, resistencia a la fuerza y equilibrio. Los niños con desnutrición presentaron disminución en la velocidad (0,13 m/s; IC 95%: 0,06-0,20; p < 0,001), fuerza explosiva (0,04 m; IC 95%: 0,01-0,07; p < 0,004) y resistencia a la fuerza.

Conclusiones: Se observó una asociación entre el estado nutricional y las capacidades físicas. Los niños con obesidad presentaron los peores resultados en las pruebas físicas, mientras que aquellos con desnutrición tuvieron una disminución en la velocidad, en la fuerza explosiva y en la resistencia a la fuerza.

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Introduction

Both nutritional deficiencies¹ and the adoption of a modern lifestyle that mark a trend towards overweight and cardiovascular risk factors, with their inevitable consequences for morbidity and mortality,² are common in developing countries.

Malnutrition is a frequent phenomenon and is the basic cause of undernutrition and obesity.³ There are 182.7 million children in the world with delayed growth secondary to severe nutritional deficiency^{4,5}; this condition is related to higher mortality. The 2010 National Nutritional Situation Survey in Colombia (ENSIN) reported a figure of 10% in children and adolescents between the ages of 5 and 17.⁶

Although undernutrition remains a public health problem in developing countries,⁵ there has been an increase in the proportion of children with overweight and obesity in Latin America, due to the phenomenon of nutritional and lifestyle transition.⁷ Childhood obesity is a risk factor for type 2 diabetes mellitus and various chronic adult illnesses, such as cardiovascular disease, cancer and osteoarthritis.^{2,8}

Some studies have reported a reduction in health-related physical ability and physical fitness in children with overweight and obesity.⁹ A decrease in peak oxygen uptake (VO_{2max}) has been observed in obese individuals, related to a decline in functional ability and increased morbidity and mortality from cardiovascular causes.¹⁰ However, maintaining health-related physical fitness by participating in physical activity and exercise programmes lessens the risk of disease and injury.¹¹

Various research studies have shown that schoolchildren have suffered a reduction in muscular strength, cardiorespiratory fitness and speed of movement in the last two

decades.^{12,13} With the increase in overweight and obesity, as well as a decrease in physical fitness, the possibility arises of an association between nutritional status and health-related physical fitness in children. Some studies have reported a relationship between obesity and physical fitness in children in various population groups^{14,15}; however, there are differences in social background, ethnicity and body composition that prevent us from extrapolating the results. Few research studies assessing this relationship have been carried out in Latin American populations.

Because undernutrition is still a public health problem in Colombia, which is undergoing a process of nutritional transition, it is important to assess the association between nutritional state, particularly undernutrition, and physical fitness, beyond the question of obesity. Information is currently limited, and no data are available from population samples of Latin American and Colombian children involved in physical activity programmes.

For this reason, the objective of this study was to assess whether there is an association between nutritional state and physical abilities in children between the ages of 6 and 18 enrolled in the Popular Sports Schools (EPDs) of the Sports and Recreation Institute (INDER) in Medellín (Colombia).

Materials and methods

A cross-sectional study was performed in 2008 that included 12,872 boys and girls aged between 6 and 18 participating regularly in physical activity, sport and recreation programmes, enrolled in the 48 EPDs of the INDER in Medellín (Colombia) and drawn from low and middle socioeconomic strata.

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