



Review article

Overweight and obesity in children and adolescents with Down syndrome—prevalence, determinants, consequences, and interventions: A literature review



Fabio Bertapelli^{a,b,*}, Ken Pitetti^c, Stamatis Agiovlasis^d, Gil Guerra-Junior^{b,e}

^a CAPES Foundation, Ministry of Education of Brazil, Brasília, DF 70040-020, Brazil

^b Growth and Development Lab, Center for Investigation in Pediatrics, Faculty of Medical Sciences, University of Campinas, Campinas, SP 13083-887, Brazil

^c Department of Physical Therapy, College of Health Professions, Wichita State University, Wichita, KS 67260-0043, USA

^d Department of Kinesiology, Mississippi State University, Mississippi State, Starkville, MS 39762, USA

^e Department of Pediatrics, Faculty of Medical Sciences, University of Campinas, Campinas, SP 13083-970, Brazil

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ABSTRACT

Background: Children with Down syndrome (DS) are more likely to be overweight or obese than the general population of youth without DS.

Aims: To review the prevalence of overweight and obesity and their determinants in youth with DS. The health consequences and the effectiveness of interventions were also examined.

Methods and procedures: A search using MEDLINE, Embase, Web of Science, Scopus, CINAHL, PsycINFO, SPORTDiscus, LILACS, and COCHRANE was conducted. From a total of 4280 studies, we included 45 original research articles published between 1988 and 2015.

Outcomes and results: The combined prevalence of overweight and obesity varied between studies from 23% to 70%. Youth with DS had higher rates of overweight and obesity than youths without DS. Likely determinants of obesity included increased leptin, decreased resting energy expenditure, comorbidities, unfavorable diet, and low physical activity levels. Obesity was positively associated with obstructive sleep apnea, dyslipidemia, hyperinsulinemia, and gait disorder. Interventions for obesity prevention and control were primarily based on exercise-based programs, and were insufficient to achieve weight or fat loss.

Conclusions and implications: Population-based research is needed to identify risk factors and support multi-factorial strategies for reducing overweight and obesity in children and adolescents with DS.

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* Corresponding author at: Growth and Development Lab, Center for Investigation in Pediatrics, Faculty of Medical Sciences, University of Campinas, SP 13083-887, Brazil.

E-mail addresses: fbertapelli@gmail.com (F. Bertapelli), ken.pitetti@wichita.edu (K. Pitetti), sagiovlasis@colled.msstate.edu (S. Agiovlasis), gilguer@fcm.unicamp.br (G. Guerra-Junior).

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What this paper adds?

A number of systematic reviews about childhood obesity have been developed. However, no systematic literature review has been conducted for youth with Down syndrome (DS). This review summarizes a large body of research on obesity and overweight in children and adolescents with DS. Overall, findings demonstrate that youth with DS have higher rates of overweight and obesity than youth without Down syndrome. This study also provides evidence on risk factors for obesity in youth with DS, as well as on the effectiveness of interventions. These findings may be useful in setting a research agenda and informing evidence-based world-wide policies for obesity prevention and control in youth with DS.

1. Introduction

Down syndrome (DS) is the most common chromosomal disorder with prevalence estimates ranging from 6.1 to 13.1 per 10,000 people (de Graaf et al., 2011; Presson et al., 2013). Life expectancy among persons with DS has substantially increased during the last century (de Graaf et al., 2011). This increasing life expectancy may be linked to expansion of governmental and non-governmental initiatives, as well as improvements in medical care and services for persons with DS (Day, Strauss, Shavelle, & Reynolds, 2005; Glasson et al., 2002; Yang, Rasmussen, & Friedman, 2002). Despite these improvements, challenges still exist for implementing health care services for children and adolescents with DS worldwide. Those challenges are linked health conditions associated with DS. These conditions include congenital heart defects, hearing and vision dysfunctions, thyroid disease, gastrointestinal disorders, cognitive impairments, obstructive sleep apnea, and muscle hypotonia (Bull, 2011; Roizen et al., 2014). Recent guidelines by the American Academy of Pediatrics and the U.S. Government for addressing public health research and health care highlighted another risk to the health profiles of persons with DS, obesity (Bull, 2011; Rasmussen, Whitehead, Collier, & Frias, 2008).

Childhood obesity has increased substantially worldwide (de Onis, Blossner, & Borghi, 2010). The etiology and health risks of childhood obesity in youth without disabilities continue to be an active area of research. Several recent reviews have examined obesity in children and adolescents with developmental disabilities (Hendrix, Prins, & Dekkers, 2014; Liou, Pi-Sunyer, & Laferrere, 2005; Maiano, Normand, Aime, & Begarie, 2014), specifically targeting children with physical disabilities, coordination disorder, and intellectual disability. However, no systematic state-of-the-science literature review has been conducted specifically for youth with DS. As it will become evident from the present review, many reports suggest that youth with DS may have even higher risk for obesity than youth in the general population. It is therefore important to review the existing knowledge-base and offer a representation of the state of the science on the topic of obesity in youth with DS. Such effort may steer future research and inform initiatives for reducing obesity in this vulnerable population of youth.

The purpose of this literature review was to examine (a) the prevalence of overweight and obesity in youth with DS from birth to age 20 years; (b) if differences exist in weight status between youth DS and youth without DS; (c) the determinants or risk factors for obesity; (d) the immediate and long term impact of obesity; and (e) the effectiveness of interventions for prevention or treatment of obesity in youth DS.

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