

Commentary

## Obesity and Secondary Conditions in Adolescents with Disabilities: Addressing the Needs of an Underserved Population

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### Abstract

Children and adolescents with physical and cognitive disabilities have a higher prevalence of overweight compared to their non-disabled peers. This health risk can lead to a greater number of obesity-related secondary conditions (e.g., fatigue, pain, deconditioning, social isolation, difficulty performing activities of daily living) and can impose significant personal and economic hardship on the child and family. Effective strategies for reducing the risk of overweight/obesity in adolescents with disabilities must begin with greater awareness of the behavioral and environmental antecedents that lead to higher rates of obesity in this underserved segment of the youth population. Research on interventions to reduce obesity among adolescents with disabilities is an important area of future research for public health scientists. A range of interventions will be necessary to overcome the many barriers that youth with disabilities experience in achieving and maintaining a healthy weight. © 2007 Society for Adolescent Medicine. All rights reserved.

Overweight in children and adolescents is a serious issue with many health and social consequences that often continue into adulthood [1]. For the more than 5.5 million children and adolescents with disabilities living in the United States and comprising approximately 12% [2] of the school-age population [3], obesity is not only a risk factor for chronic conditions such as high blood pressure, hyperlipidemia, and insulin resistance, but it also presents a greater risk for developing secondary conditions associated with the primary disability. These secondary conditions include mobility limitations, extreme levels of deconditioning, fatigue, pain, pressure sores, depression, and social isolation [4].

Chronic and secondary conditions associated with obesity in youth with disabilities can undermine independence and limit opportunities for community engagement

in work, leisure and physical activity [5]. As noted in the Healthy People 2010 report, eliminating health disparities among subgroups of the population who are vulnerable to higher levels of chronic conditions is a major priority in the nation's health agenda [6]. Specifically, there is a strong need to lower the risk of obesity and obesity-related secondary conditions among youth with disabilities. The importance of promoting healthy behaviors among youth and adults with disabilities has been highlighted in the recent Surgeon General's Report on the Health and Wellness of People with Disabilities [7]. In this report, the Surgeon General states that more effort must be made to enhance the health of people with disabilities by increasing their ability to self-manage their own health. The report also states that decreasing the incidence of obesity among children, adolescents, and adults with disabilities must become a major priority in public health research and education for this population. It is therefore imperative to increase awareness about these important health issues for adolescents with disabilities and to address them in interventions specifically designed to remove barriers to good health.

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### Higher Levels of Obesity Among Youth with Disabilities

Overweight is a significant health issue among adolescents with disabilities. In select populations, researchers have reported a higher prevalence of overweight among children and adolescents with spina bifida [5,8], cerebral palsy [9], Prader-Willi syndrome [10,11], Down syndrome [12], muscular dystrophy [13], brain injury [14], visual impairments [15], learning disabilities [16], attention deficit hyperactivity disorder (ADHD), and autism spectrum disorders [17].

Secondary analyses of data from three population-based studies provide evidence that children with disabilities have a greater risk for obesity than their non-disabled peers. First, data extracted from the 1999–2002 National Health and Nutrition Examination Survey (NHANES) shown in Figure 1, indicates that the rate of overweight (i.e., BMI  $\geq$  95th percentile for age and sex) was significantly higher ( $p < .05$ ) for youth (6–17 years) with mobility limitations (29.7%) compared to youth without mobility limitations (15.7%) [16].

Next, our secondary analysis of the 2005 Youth Risk Behavior Survey (YRBS) data [18] shown in Figure 2 compares the prevalence of overweight across two groups of nationally representative samples of 9th–12th-grade students with and without physical disabilities by sex. Students who self-reported the presence of “any physical disabilities or long-term health problems” were defined as adolescents with a physical disability. The YRBS data suggest that overweight is more prevalent among adolescents with physical disabilities (16.7%, 95% confidence interval [CI] = 13.77–19.61) than their age-matched peers without physical disabilities (12.8%, 95% CI = 12.00–13.64).

Finally, in a recently published national study conducted on the obesity levels of Taiwanese children and adolescents with intellectual disabilities, researchers reported that average BMI was higher for this group than age-and gender-matched population-based norms on non-disabled youth

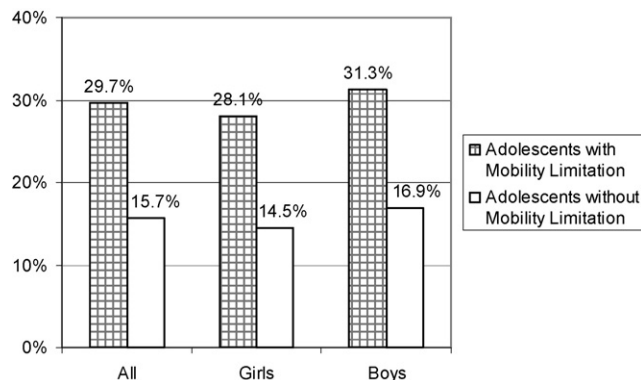


Figure 1. Prevalence of overweight (body mass index [BMI]  $\geq$ 95th percentile) among youth ages 6–17 years, by disability and gender. (Based on Ref. [16]).

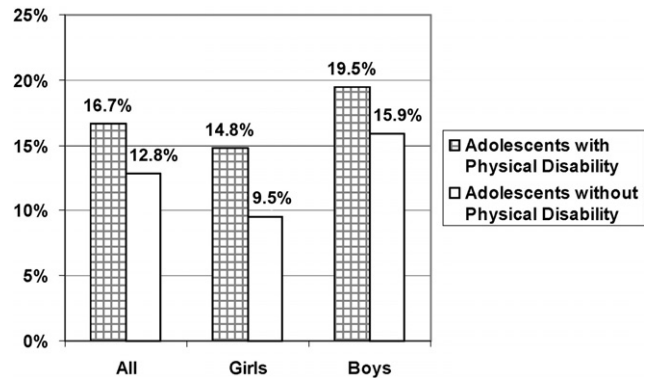


Figure 2. Prevalence of overweight (body mass index [BMI]  $\geq$ 95th percentile) among high school students, by disability and gender. (Based on authors’ analysis of the 2005 Youth Risk Behavior Survey data.)

from Taiwan’s Third National Nutrition and Health Survey (1993–1996) [19]. Criteria used for overweight (referred to as obesity in this study) was the same as the U.S. studies for the NHANES and YRBS data sets (i.e., BMI  $\geq$ 95th percentile for age and sex). The overall prevalence of overweight among youth with intellectual disabilities was 18%. An age-specific prevalence was 22% in adolescents aged 7–12 years, and 16% for adolescents aged 13–18 years.

### Potential Antecedents of Obesity Among Youth with Disabilities

Given the higher prevalence of overweight/obesity among adolescents with physical and cognitive disabilities, there is an urgent need to better understand the potential antecedents that may precipitate this health condition. In this section we identify potential antecedents of obesity unique to youth with disabilities divided into four categories: (1) physical activity, (2) nutrition, (3) knowledge or awareness, and (4) social participation.

#### Physical activity

Several studies have reported that people with disabilities are more likely to be sedentary [6,20–23] and experience substantially more barriers to physical activity participation compared to the general population [24,25]. Sedentary behaviors, such as watching television, and/or playing video games, have already been linked to reduced physical activity levels among youth without disabilities [26]. These sedentary behaviors have been reported to be higher among youth with disabilities because of physical, sensory, and/or cognitive impairments that make it more difficult to participate in competitive sports and recreational games with other youth who have more refined motor skills and higher fitness levels [27]. As a result of not being able to compete successfully in sports and recreational activities, youth with disabilities may avoid more physically demanding activities that require higher energy expenditure (i.e.,

soccer, basketball) and are therefore likely to have greater amounts of time (i.e., after school, weekends) spent in sedentary behaviors [28].

Although the Individuals with Disabilities Education Act (IDEA) requires that all children and adolescents with disabilities are included in physical education, the majority of youth with disabilities do not receive the same amount of physical activity as their non-disabled peers. Adaptive exercise equipment is rarely available, play fields are difficult or impossible to traverse for youth who use wheelchairs, and class sizes are often too large to allow adapted instruction for youth with disabilities.

Secondary conditions associated with a primary disability can also adversely impact a youth's ability to participate in moderate to vigorous physical activity. For example, many youth with cerebral palsy and spina bifida experience joint and muscle pain resulting from the long-term effects of spasticity and/or overusing certain muscle groups necessary for manually pushing a wheelchair or using crutches to ambulate [29]. Low physical fitness, balance impairments, and poor coordination skills also make it more difficult for youth with disabilities to participate in team sports with their non-disabled peers [30,31].

Factors within the built environment such as lack of sidewalks, damaged sidewalks or curb cuts, and inaccessible access routes (i.e., because of construction or snow) can serve as substantial barriers to participating in outdoor physical activity among youth with disabilities [32]. Lack of access to fitness facilities and recreation areas such as playgrounds, gyms and swimming pools, inaccessible sports and fitness equipment, and the lack of knowledge among staff on how to infuse disability-specific content into regular programs for youth without disabilities (i.e., adapting games and sports) are also major barriers to physical activity participation in this population [27]. Lack of programmatic access to community sports and recreation programs and school-based physical education classes and outdoor recess areas also presents substantial barriers to physical activity participation among many youth with disabilities [27]. Finally, unsafe neighborhoods and/or overprotective parents may limit opportunities for youth with disabilities to play outdoors.

### *Nutrition*

Nutritional issues associated with various types of physical and cognitive disabilities may increase the risk of obesity in certain youth. For example, some children with autism have atypical feeding behaviors that are unique to this population. One such example is the consumption of only a limited number of food types that include "yellow" high-calorie foods (i.e., French fries, chicken nuggets) [33]. Children born with certain genetic conditions such as Prader-Willi, Down syndrome, and spina bifida have a predisposition towards overeating and a greater likelihood of

becoming obese [34,35]. Some families constantly offer food that is not low in fat or calories, which may be motivated by guilt, stress, or the fear of appearing not to be a caring parent [36]. The common use of food as a reinforcer when children are sad or lonely can confuse some youth with disabilities into assuming that food is a treatment for uncomfortable feelings [36]. Overprotective parents also may use highly dense caloric foods as reinforcers for good behavior [37].

Several environmental factors may predispose adolescents with disabilities to becoming overweight or obese. Design of school-based nutritional interventions are often too generic for certain youth with physical or cognitive disabilities because the materials do not address specific nutritional concerns associated with a particular disability (e.g., spina bifida, cerebral palsy, Down syndrome) [37]. Accommodations to respond to the particular nutritional needs of youth with disabilities take many forms including appropriate physical access to textbook materials for youth with mobility impairments who have limited use of their hands, appropriate reading levels for youth with cognitive impairments, and large-print and electronic materials for youth with sensory impairments and/or learning disabilities. Similarly, many school health education curriculums are designed to teach adolescents how to prepare and purchase healthy foods, since they have partial or full control over the types of foods they consume. However, in some youth with disabilities, food purchase and preparation is controlled entirely by the parent or caregiver and future opportunities in adulthood to prepare meals may be the responsibility of a personal assistant or service provider (i.e., group home facility) [38].

Other factors that may be associated with obesity in youth with disabilities include the higher rate of poverty reported among caregivers of youth with disabilities [39]. Limited finances may make it difficult to purchase healthier but generally more expensive food items such as fruits and vegetables. Food service positions are often used in high school special education job training programs for youth with developmental disabilities, which may predispose them to higher calorie food consumption and obesity. Fast food restaurants are also common employment options in many community-based vocational service programs for adolescents and young adults with intellectual disabilities [40]. In such work environments, employees with disabilities are exposed to increased opportunities to consume greater quantities of high-fat foods.

### *Knowledge or awareness*

Lack of knowledge about healthy lifestyle behaviors may predispose youth with disabilities to a higher risk of weight gain. For example, youth with cognitive disabilities may be less conscious of the health risks associated with excess body weight and may have limited knowledge or under-

standing of its potential consequences [37,41,42]. Other youth may have difficulty understanding or following through with self-monitoring techniques such as reducing dietary fat or exercising at a certain intensity level [37]. In addition, some youth may not understand or be aware of the health risks associated with poor diet or lack of physical activity [42]. Health care providers may contribute to the problem by not adequately addressing secondary conditions such as weight gain among youth with disabilities. Some parents may perceive that primary care providers are more concerned about addressing medication-related issues and may not be as concerned with their child's body weight status.

### *Social participation*

For many youth with disabilities, behavioral and/or learning disorders may limit opportunities for engaging in social events with their peers, which may lead to feelings of isolation and the potential for overeating to fill these social gaps. Stevens et al. reported that adolescents with physical disabilities had a more difficult time making friends, which resulted in less social engagement compared to non-disabled youth [43]. Children with mental retardation reported that they played less frequently with other children compared to non-disabled peers [44], and children with CP were often less accepted by their classmates and had a greater likelihood of being bullied compared to their classmates without disabilities [45]. Other socially limiting factors include negative attitudes, labeling, and language that exclude youth with disabilities from participating in many school or community-based programs, and limited administrative support for implementing necessary accommodations to include children and adolescents with disabilities in school activities [27]. Low self-esteem, negative body image or self-concept, increased stress levels and poor socialization ability are often manifestations of some disabilities (i.e., mental illness, emotional disturbance, learning disabilities) and also may limit opportunities for social participation [37,46].

Many youth with physical disabilities who use wheelchairs for mobility have difficulty attending social events with their peers because of inaccessible or minimally accessible facilities, including the homes of other youth, high school sporting events (i.e., bleachers, soccer fields, etc.), movie theaters (i.e., small seating section for wheelchair users often in remote areas of theater), restaurants (entrance steps) and amusement parks (most rides are not accessible). Similarly, lack of accessible transportation often prevents many youth from engaging in social activities with their peers.

### **Targeting Obesity Reduction in Youth with Disabilities**

The substantial physical, social, and attitudinal barriers experienced by many youth with disabilities [47] presents a challenge to health professionals and researchers to find

innovative ways to reduce or prevent obesity in this underserved and marginalized population. An effective national strategy to lower overweight/obesity among adolescents with disabilities must focus on prevention strategies that begin early in life so that healthy lifestyle habits are established during this important developmental period [48]. Adolescence offers what may be a near final "window of opportunity" to empower youth with disabilities to manage their weight and to develop key health behaviors that can reduce their risk of obesity and obesity-related secondary conditions in adulthood.

Several secondary conditions reported by people with disabilities including chronic pain, social isolation, depression, falls or other injuries, and extreme fatigue are likely to worsen with excess weight [6]. Lack of health education and health awareness exacerbate the limited access to physical activity and nutrition among youth with disabilities, creating formidable barriers to effective health promotion and increasing the likelihood of obesity in adolescence and adulthood [49–52].

### **Adolescents with Disabilities: Future Research**

The lack of effective interventions for weight management in youth with disabilities substantially limits opportunities to improve their current health status and reduce future health risks associated with obesity. There is a critical need to systematically identify key factors (i.e., antecedents) that lead to higher levels of obesity among youth in different disability subgroups. For some youth, obesity may be related to *personal* factors such as genetics, poor diet or nutritional knowledge, inadequate levels of physical activity, and use of certain weight-gaining medications (e.g., anticonvulsant or antipsychotic agents; steroids). For others, *environmental* factors may play a greater role, such as overprotective parents, unsafe neighborhoods, and lack of physical and programmatic access to recreational facilities and programs. Understanding the personal and environmental contextual factors associated with overweight/obesity in adolescents with disabilities, and determining the potential secondary conditions associated with these factors, is a critical area of research for being able to design future interventions that address these important issues.

Researchers must identify weight management strategies for youth with disabilities that are cost-effective and culturally and functionally relevant for this population. The current literature on weight management/weight reduction strategies targeting youth has focused almost entirely on youth *without* disabilities [53]. This has created a substantial void in the literature on successful interventions for youth *with* disabilities. Effective health promotion interventions for youth with disabilities must be tailored to their ability and interest level, address the physical, cognitive, and/or sensory limitations that may accommodate their disability, and eliminate environmental barriers that they may

encounter as a result of not being able to participate in typical school or community-based health education and physical activity programs [48,54]. Research must also identify more accurate measures to identify obesity in adolescents with disabilities. Adolescents whose disability involves some form of paralysis or paresis have significant alterations in body composition, and BMI may not accurately estimate adiposity if the proportion of lean, fat, and bone tissue varies considerably from the norm. Despite a good correlation between BMI and percent body fat in non-disabled youth, two small studies have indicated that BMI is not an accurate estimate of adiposity in youth with physical disabilities [55,56]. Therefore, accurate screening measures must be developed and tested, taking into account these differences in body composition. Adolescence is an important developmental period for teaching youth with disabilities and their caregivers how to manage weight and reduce their risk of obesity-related secondary conditions.

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