

RESEARCH ARTICLE

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The prevalence of obesity in children with autism: a secondary data analysis using nationally representative data from the National Survey of Children's Health

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Abstract

Background: The prevalence of childhood obesity has increased dramatically in the last two decades and numerous efforts to understand, intervene on, and prevent this significant threat to children's health are underway for many segments of the pediatric population. Understanding the prevalence of obesity in populations of children with developmental disorders is an important undertaking, as the factors that give rise to obesity may not be the same as for typically developing children, and because prevention and treatment efforts may need to be tailored to meet their needs and the needs of their families. The goal of the current study was to estimate the prevalence of obesity in children and adolescents with autism.

Methods: This study was a secondary data analysis of cross-sectional nationally representative data collected by telephone interview of parents/guardians on 85,272 children ages 3-17 from the 2003-2004 National Survey of Children's Health (NSCH). Autism was determined by response to the question, "Has a doctor or health professional ever told you that your child has autism?" Children and adolescents were classified as obese according to CDC guidelines for body mass index (BMI) for age and sex.

Results: The prevalence of obesity in children with autism was 30.4% compared to 23.6% of children without autism ($p = .075$). The unadjusted odds of obesity in children with autism was 1.42 (95% confidence interval (CI): 1.00, 2.02, $p = .052$) compared to children without autism.

Conclusions: Based on US nationally representative data, children with autism have a prevalence of obesity at least as high as children overall. These findings suggest that additional research is warranted to understand better the factors that influence the development of obesity in this population of children.

Background

Obesity has become a significant health concern in children in the United States, with the prevalence of childhood obesity having tripled over the last twenty years. The current prevalence of obesity among children and adolescents in the United States ages 2-19 years is 16.3% and the prevalence of overweight is 31.9%[1]. Childhood obesity is associated with an increased risk for elevated cardiovascular risk factor levels, Type 2 diabetes,

orthopedic problems, sleep apnea, and menstrual irregularities[2]. Children who are overweight or obese are more likely to be obese as adults which increases their risk for chronic diseases such as diabetes, cardiovascular disease, and certain cancers[3-5].

Despite a growing literature on the problem of childhood obesity in the general population, little research has been done to examine this problem in children with developmental disabilities, including children with autism spectrum disorders (ASDs), a population of children who may be particularly vulnerable to development of obesity by virtue of the complex behavioral, physical, and psychosocial difficulties that they experience.

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Table 1 Demographic characteristics of children with and without autism

	Children without autism	Children with autism
Gender		
Female	49.0 (0.31)	21.0 (2.68)
Male	51.0 (0.31)	79.0 (2.68)
Racial ethnic group		
Hispanic	16.9 (0.25)	10.0 (3.18)
Non-Hispanic white	61.4 (0.31)	70.4 (4.34)
Non-Hispanic black	14.6 (0.23)	15.5 (3.86)
Multi-racial	2.9 (0.10)	1.5 (0.55)
Other	4.2 (0.18)	2.6 (0.93)
Poverty-to-Income ratio		
<1	17.0 (0.28)	18.1 (4.70)
1 - <2	22.7 (0.28)	21.9 (3.29)
2 - <4	33.4 (0.29)	32.9 (3.57)
>4	26.8 (0.26)	27.0 (3.05)

Percentage (standard error) tabulated. Estimates are weighted to be representative of US children.

The prevalence of obesity in children with autism was 30.4% compared to 23.6% of children without autism ($p = 0.075$). Children with autism were more likely to be obese than children without autism; the unadjusted odds of obesity in children with autism was 1.42 (95% CI, 1.00, 2.02, $p = .052$) compared to children without autism. These findings are presented in Table 2.

Discussion

The results of this study suggest that children with autism are at least as likely to be obese as children who do not have autism. Based on our analysis, our best estimate indicates that children with autism are 40% more likely to be obese compared with children without autism. However, because the number of children with autism assessed was small, estimates cannot be broken out by age and sex of the child, and the confidence interval for the overall prevalence of obesity in children with autism is wide. Thus, our estimate is consistent both with children with autism having the same prevalence of obesity as other children as well as children with autism being twice as likely to be obese as other children.

Although obesity is always a result of an energy imbalance, the specific factors that contribute to excess energy intake and/or low energy expenditure among various subgroups of the general population are not yet well understood. Our analyses of the National Survey of Children's Health are descriptive and not designed to explore risk factors for obesity in children with autism. For this reason we did not adjust the estimates presented for sociodemographic or other covariates. Children with ASDs may have atypical physical activity and eating patterns that are uniquely associated with the development of obesity. For example, children with ASDs are known to have motor impairments that may adversely affect their ability to participate in sports or physical activities successfully. Such motor impairments include poor motor skills, unevenness of developmental milestone acquisition, low muscle-tone, oral-motor problems, and postural instability[16-23]. In addition, children with ASDs may experience low levels of physical activity due to their impairments in social skills which may limit participation in structured activities with peers. In fact, a recent study found that praxis/motor planning in children with autism was strongly correlated with the social, communicative, and behavioral impairments that define the disorder[24].

Children with ASDs have also been reported to have unusual eating habits, most frequently described as overly selective. A handful of small studies have documented that children with ASDs have aversions to specific textures, colors, smells, temperatures, and brand names of foods, with some preferences for soft and sweet foods [25-28]. In a larger study, Schreck et al. [29] reported that children with autism demonstrated more food selectivity than typically developing children and that the children with autism preferred energy dense foods within food groups (e.g., chicken nuggets, hotdogs, peanut butter, cake, etc.). It is possible that these eating patterns may contribute to the development of obesity in this population of children.

A strength of this study is that it is based on nationally representative data and adds to the extant literature that is primarily comprised of smaller studies. However, several limitations of the current study are noteworthy. The key measures are provided by parental report as

Table 2 Obesity in children with autism compared to children without autism

	Children without autism	Children with autism	P value for difference
Prevalence (standard error) for obesity*	23.6% (0.27)	30.4% (3.79)	0.075
Logistic regression model	Odds ratio (95% confidence interval) for obesity for children with autism compared to those without		
Estimate	Standard Error	P value	Odds Ratio
0.35	0.18	0.052	1.42
			95% CI
			1.00, 2.02

Obesity defined as BMI-for-age greater than or equal to the 95th percentile of the CDC sex-specific BMI growth chart.

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