Obesity among adolescents with physical disabilities

Lawrence C. Vogel, M.D.¹,², Pamela L. Patt, RDN, Susan Lescher, MT³, Kiyoshi Yamaki,Ph.D.⁴, Brienne Davis Lowry, MPH², James H. Rimmer, Ph.D⁴
⁴Shriners Hospitals for Children, Chicago, IL; ²University of Illinois, Chicago, IL; ³Rush University, Chicago, IL; University of Alabama, Birmingham, AL

BACKGROUND

Obesity is a critical health problem among American children, leading to an increased risk of adverse health consequences. Obesity is also a significant health concern among children with disabilities. The current and future health consequences of obesity could be more intense for these children, who already have impairments and related functional limitations, than those without a disability. Research has shown a higher rate of overweight among youth with mobility limitations than those without mobility limitations.

The majority of obesity reporting is through population-based data sets, which frequently use self-reported height and weight data. While this data is more readily available, it has also been shown to under-report obesity prevalence vs. data using actual measurement. This discrepancy may be even more pronounced among those with disabilities. The majority of surveillance data is also limited by the defining of disability based on functional limitations, potentially obscuring differences in weight status by specific disability types.

METHODS

Data: The study utilizes existing demographic and anthropometric data from the physical exam records of approximately 1210 adolescents (15-20 years) with physical disabilities. Data was collected from 5 pediatric specialty hospitals (Tampa, Portland, Honolulu, Chicago and Sacramento).

Status Variables: Disability: Patients' disability status was identified using ICD-9 codes. Records were screened to include only patients with cerebral palsy (CP), spinal cord injury (SCI), spina bifida (SB), osteogenesis imperfecta (OI), orthopaedic conditions (ORTHO) (Blount's disease or slipped capital femoral epiphysis), and cleft lip and palate (CLP). Those who had one or more of these diagnoses were considered to have physical disabilities.

Body Weight Status: BMI percentile score was calculated using the body weight and height, age-in-months and sex included in the medical record. Following a commonly used procedure, age-in-months was approximated by adding six months to the age in years reported by patients.

Using these variables, respondents were classified into the following categories: obese (BMI ≥ 95th percentile) or overweight (BMI 85th - 94th percentile), healthy BMI (BMI 50th - 84th percentile) or underweight (BMI < 5th percentile).

Analysis:

Pooled cross sectional analysis was conducted by aggregating disabilities into 6 groups to produce stable estimates. A statistical weight was used to produce population-level estimates and associated 95% confidence intervals. The difference in obese/overweight prevalence across x groups was tested using a 95% confidence interval. SPSS 18 Complex Sample Add-on was used for analyses to accommodate the complex sampling design employed by these programs.

RESULTS

Weight distribution categories of adolescents as a function of diagnostic categories are shown in Table 1. Obesity was most common in those with orthopaedic conditions (54.4%), followed by SCI and SB (26.5% and 25.9%, respectively). In contrast, underweight was most common in those with SCI (26.1%) and CP (18.5%). Combining all diagnostic categories, older adolescents (19-20) were more likely to be underweight (24.5%) compared to younger adolescents (12.0% and 14.9% in 15-16 years and 17-18 years, respectively) and this difference remained when analyzed separately for males and females.

Disability:

Autosomal Rett Syndrome (ARS), disability due to non-accidental trauma (NAT), Down syndrome (DS), spina bifida (SB), scoliosis (SCL), spina bifida occulta (SBO), Blount's disease (BLT), congenital hip dislocation (CHD), cleft lip and palate (CLP), spina bifida occulta (SBFO), and club foot (CF) were included in the analysis.

Age:

Ages 15-16 (n=860) 19.4% (17.6-21.4) 12.4% (10.7-14.2) 52.9% (49.6-56.2) 21.3% (18.6-24.4)

Ages 17-18 (n=1150) 19.2% (17.7-20.7) 13.7% (11.8-16.2) 50.6% (47.5-53.6) 22.2% (19.5-25.4)

Ages 19-20 (n=1500) 17.8% (16.2-19.5) 12.7% (11.0-14.5) 52.7% (49.8-55.5) 17.8% (15.6-20.1)

Table 1. Weight Distribution as a function of age (percentage with 95% confidence intervals)

Table 4. Weight Distribution as a function of age and Sex (percentage with 95% confidence intervals)

Table 3. Weight Distribution as a function of age for Males (percentage with 95% confidence intervals)

RESULTS. CONT.

CONCLUSIONS

Limitations: Neither the method of measurement nor the accuracy of these methods is known for the adolescents included in this data set, and are likely to have varied by hospital, person performing the measurement, and the type of disability.

Due to the limitations of BMI to detect differences in lean tissue and fat mass in the body, both of which may vary significantly across populations and disability type, it may be an inaccurate indicator of body weight status among those with physical disabilities.

Conclusion: Obesity among youth with physical disabilities can have a significant impact on their mental and physical health, and cause problems that can further aggravate their current condition while setting them up for health risks that will follow them into adulthood. Because BMI may underestimate the degree of obesity in adolescents with lower extremity paralysis, the incidence of obesity may be an even greater problem for those with SB and SCI than is illustrated using this measure of body weight status. The higher percentage of underweight adolescents with CP and SCI merits further investigation and appropriate investigations.

Increased focus on monitoring the weight status of youth with physical disabilities, perhaps exploring methods of body fat composition more specific than BMI, may aid in the improvement of quality of life, prevention of secondary conditions and the reduction of obesity related health risks in these individuals.

Support: This project is supported by Grant H133A100011 from the National Institute on Disability and Rehabilitation Research, U.S. Department of Education

Contact Information: Lawrence C. Vogel, MD lvogel@shrinernet.org