



Contents lists available at ScienceDirect

Disability and Health Journal

journal homepage: www.disabilityandhealthjnl.com

Physical activity and obesity among nine-year-old children with and without chronic health problems, illness, or disabilities in Ireland

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ARTICLE INFO

Article history:

Received 3 February 2017

Received in revised form

4 August 2017

Accepted 4 August 2017

Keywords:

Physical activity

Disability

Obesity

Caregiver

ABSTRACT

Background: Regular engagement in physical activity can help youth control their weight during childhood while decreasing one's chances of developing chronic diseases (e.g., coronary heart disease, diabetes) throughout the lifespan. While numerous studies have explored physical activity participation and weight status among typically developing children, few epidemiological studies utilizing nationally representative data has focused on children with chronic health problems, illness, or disabilities (CHID). **Objective:** Thus, the primary purpose of this secondary-data analysis was to examine physical activity participation and the prevalence of overweight/obesity among nine-year-old children with CHID in Ireland.

Methods: The weighted nationally-represented data for the obesity analysis (N = 6114) and physical activity analysis (N = 6165) were derived from the Growing up in Ireland national study. Logistic regression analyses were conducted to examine associations between child weight status and likelihood of meeting physical activity guidelines. Children's primary caregiver weight status, child gender, and CHID status were correlates, while estimated household income, reported hours of weekly physical education, and locale were covariates.

Results: Children with CHID had significantly higher odds (1.51, 95% CI 1.19–1.91) of being classified as overweight/obese compared to peers without CHID, when controlling for locale, income, and weekly physical education hours. Conversely, having a CHID was not significantly associated with the odds of children meeting recommended physical activity guidelines.

Conclusions: Children with CHID had significantly higher odds of being overweight/obese, and these odds increased if the child had a primary caregiver who was overweight/obese. Physical activity levels did not differ between children with and without CHID.

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Introduction

As of 2013, 23.8% of boys and 22.6% of girls were considered overweight or obese in developing countries worldwide.¹ The rising prevalence of overweight and obesity in children is a major public health issue which has been described as a global pandemic.² Decreasing levels of physical activity, among other factors (e.g., excessive sedentary behaviors), have been identified as a modifiable causal factor influencing large increases in obesity among youth.^{3–5} Regular engagement in physical activity can help

youth control their weight during childhood while decreasing one's chances of developing chronic diseases throughout the lifespan.⁶ Because regular participation in physical activity is essential for normal development and obesity prevention, international guidelines suggest that children engage in at least 60 min of moderate-to-vigorous physical activity per day.^{7,8}

While physical activity recommendations exist, physical activity participation among children remains low internationally, including in European countries, such as Ireland. Recent research using population-based data of Irish children suggested that just 25% of nine-year-olds met physical activity recommendations.⁹ Among nine-year-old Irish children, adherence to physical activity recommendations depended on a number of factors; for example social factors, such as spending time with friends, were

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associated with higher levels of physical activity participation.¹⁰ Youth who tend to be inactive are at a greater risk for developing health related issues such as obesity. The prevalence of obesity and overweight among children in Ireland exceeded international averages among developing countries, with 33.5% of boys and 33.7% of girls being above normal weight status.¹

Although numerous studies have been conducted that explore physical activity and obesity among children internationally, few epidemiological studies utilizing nationally representative data focus on children with chronic health problems, illnesses, or disabilities (CHID). Wilson, Haegele, and Zhu¹¹ examined physical activity participation, screen time habits, and the prevalence of overweight/obesity among children with mobility limitations and those enrolled in special education services aged 5–11 years in the United States (US). They found boys with mobility limitations to have significantly lower odds of meeting physical activity guidelines than peers without limitations.¹² Similarly, Kim and colleagues,¹² utilizing nationally representative data from the National Health and Nutrition Examination Survey in the US, found adolescents with disabilities to be more likely to be obese and less likely to engage in physical activity compared to peers without disabilities. Numerous factors (e.g., personal, social, environmental) have been identified which act as barriers to physical activity participation for youth with CHID which may lead them to select slower paced or sedentary leisure activities.^{13–15} For example, Moola and colleagues¹⁵ identified social barriers related to disclosing issues related to having a chronic illness as impactful in physical activity settings among youth with congenital heart disease.

Although disability-related population-based research utilizing nationally representative data has been conducted in North America,^{11,12,16} research of this nature is sparse in numerous European countries, such as Ireland. Recently, Healy, Haegele, Grenier, and Garcia¹⁷ explored physical activity participation, screen-time habits, and obesity among 13-year olds in Ireland with autism spectrum disorder. However, this research is limited to a relatively small group of individuals with disabilities (those with autism spectrum disorder) and the barriers to physical activity participation experienced by those with autism spectrum disorder, and thus participation rates, are likely different from those experiencing other CHID. Therefore, the primary purpose of this study was to examine physical activity participation and the prevalence of overweight/obesity among nine-year-old children with CHID in Ireland. Research suggests that gender and parental weight status can influence weight status and engagement in physical activity among youth.^{18–20} Hence, a secondary purpose of this study was to determine how gender and primary caregiver weight status is associated with physical activity and weight status among children with CHID.

Methods

Data source

Data were used from wave 1 of the “Growing up in Ireland” (GUI) national study of the factors that contribute to the development of 9-year-old children in Ireland. Wave 1 of the study involved a nationally representative sample of 8500 nine-year-olds. Data were collected using questionnaires and home interviews of the child, parent, teacher, and principal. Data collection occurred between August 2007 and May 2008. A two stage selection process was used in which the school was the primary sampling unit, with the children in the school being the secondary units. The use of schools provide an efficient natural clustering of children. A representative sample of 910 schools participated in the study: a

sample of children and their families was then randomly generated from the participating schools. The response rate at the school level was 82%, and 57% at the child level. Data was weighted to ensure it is representative of all nine-year-olds in Ireland. Additional information may be found in the study’s technical report.²¹ Actual analytic sample sizes varied depending on participants providing all necessary information. Sample sizes and demographic information for participants are presented in [Table 1](#).

Demographic variables

Demographic variables included gender, locale, and socio economic status. For locale, parents were asked to describe the place where their household was situated and were able to select either ‘in open country’, which was coded as ‘rural’, or a variety of specific urbanized locations, which were coded as ‘urban’. Socio economic status was represented by equivalized-household income (i.e., the total income of a household, after tax and other deductions, that is available for spending or saving), which was weighted to account for differences in size and composition of households in terms of the number of adults and children in the home. In addition, time spent in physical education was included as a covariate, which consisted of a teacher-provided response to the question “Approximately how many hours per week does the Study Child’s class spend on each of the following subjects <physical education>, within normal school hours? Your best estimate is fine. If the class does not receive instruction in a subject, please write ‘none’”.

CHID variables

Children with CHID were identified by parental reports, using the question “Does <child> have any on-going chronic physical or mental health problem, illness or disability?”. Furthermore, parents identified their child’s “problem, illness or disability” as being diagnosed by a medical professional. Ethical approval for data collection was granted by the Research Ethics Committee (REC) of the Health Research Board based in Dublin, Ireland.

Child and caregiver weight status

Body mass index has shown to correlate strongly with measures of body fat derived from direct physiological assessment.²² To calculate a body mass index score for each respondent (child and primary caregiver), the interviewer measured the weight and height of each participant in each household. A Leicester portable height measure was used to record height to the nearest millimeter. Weight was measured to the nearest kilogram, using Class IV, medically approved scales (SECA 761). Body mass index was calculated by dividing weight in kilograms by height in meters squared. Body mass index cut-offs, standardized by age and sex, as provided by the International Obesity Task Force (IOTF),²³ were used to classify individuals as non-overweight, overweight, or obese. As per recommendations by Cole et al.²³ overweight/obese status was classified as having a body mass index of over 19.5.

Physical activity

Physical activity was measured using self-report, whereby the child was asked the question: Over the past 7 days on how many days were you physically active for a total of at least 60 min per day? The child responded using an eight-point scale ranging from zero (no days) to eight (seven days). Children were classified as meeting the physical activity guidelines if they reported being active for at least an hour on seven days.

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