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BRIEF REPORT

Recent Temporal Trends in Parent-Reported Physical Activity in Children in the United States, 2009 to 2014

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Abstract

The objective of this study was to provide recent temporal trends in parent-reported physical activity in children (6-11 years) between 2009 and 2014. Data from the 2009 to 2014 National Health and Nutrition Examination Survey were used. The analytic sample included 3946 children. Parent proxy of child physical activity at each of the 3 2-year cycles was assessed. For the entire sample, there was a quadratic trend, with the number of days children engaged in at least 60 min/d of physical activity increasing in the period 2011 to 2012 (6.12 days) when compared with the period 2009 to 2010 (5.96 days) and then decreasing in the period 2013 to 2014 (5.83 days). A similar quadratic trend was evident for boys, those above the poverty level, non-Hispanic whites (particularly boys), and those with less than the 85th body mass index-for-age percentile based on sex. A negative linear trend was observed for those above the poverty level and non-Hispanic whites (particularly girls). In conclusion, these findings provide suggestive evidence that over the past 6 years (1999-2014), parents report that children's physical activity has slightly decreased in the latest years, with this observation being most pronounced in boys, those above the poverty level, non-Hispanic whites, and those with less than the 85th body mass index-for-age and sex percentile. Encouragingly, however, across all evaluated subpopulations, most children (55%-82%), as determined by their parents, engaged in 60 min/d of physical activity (consistent with government recommendations).

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Despite the established benefits associated with physical activity,[1] there is limited research on temporal trends in children's physical activity, with some evidence to suggest that up to approximately 2005,[2] children's physical activity levels may have been decreasing. More recent work published in 2009[3] suggests similar trends. Most recently in 2015, Booth et al[4] published a review article on physical activity temporal trends in children and adolescents, with the evaluated studies published up to approximately 2010. Their overall conclusions were that active transport is declining in youth, there are mixed findings with regard to trends in overall sport participation, and there is little generalizable evidence to draw conclusions on temporal trends in physical education and physical activity during school. They also note that the few studies examining temporal trends in objectively measured physical activity indicate little change. In contrast, Iannotti and Wang[5] reported temporal trends in physical activity among a national US sample of adolescents during the 2001 to 2002, 2005 to 2006, and 2009 to 2010 cycles from the Health Behavior in School-Aged Children survey. In this adolescent sample from the Health Behavior in School-Aged Children survey, the mean number of days adolescents engaged in physical activity for at least 60 min/d increased over the evaluated time periods (4.33 days in 2001-2002, 4.35 days in 2005-2006, and 4.53 days in 2009-2010). Taken together, temporal physical activity trends in children and adolescents are inconsistent across the literature. In addition, no nationally representative studies have compared recent (last 1-2 years) physical activity data to past trend data. As a result, the purpose of this brief report was to examine temporal trends in children's physical activity between 2009 and 2014 using data from the population-based National Health and Nutrition Examination

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TABLE 1. Weighted Demographic Characteristics Across the Evaluated Cycles (2009-2014 NHANES; N=3946)[a]

Characteristic	Mean (95% CI) number of days per week engaged in ≥60 min/d of physical activity			
	2009-2010 (n=1253)	2011-2012 (n=1326)	2013-2014 (n=1367)	*P* value[b]
Age (y), mean	8.50 (8.42-8.57)	8.45 (8.34-8.55)	8.47 (8.37-8.57)	.65
Sex (%)				.99
Male	51.0 (47.2-54.8)	51.1 (46.8-55.2)	51.0 (46.2-55.8)	
Female	49.0 (45.1-52.7)	48.9 (44.7-53.1)	49.0 (44.1-53.7)	
Race/ethnicity (%)				.96
Non-Hispanic white	55.7 (48.5-62.8)	53.2 (43.3-62.9)	51.7 (40.8-62.6)	
Non-Hispanic black	13.8 (10.6-16.9)	14.8 (10.1-19.5)	13.7 (9.7-17.7)	
Mexican American	15.6 (9.2-21.9)	15.1 (8.0-22.2)	16.9 (11.3-22.5)	
Income-to-poverty ratio,[c] mean	2.50 (2.34-2.65)	2.36 (2.08-2.64)	2.39 (2.04-2.73)	.54
BMI (kg/m^2), mean	18.4 (18.2-18.6)	18.6 (18.2-19.0)	18.5 (18.1-18.9)	.81

[a]BMI = body mass index; NHANES = National Health and Nutrition Examination Survey.

[b]For continuous variables (age, income-to-poverty ratio, and BMI), a linear trend analysis was computed by using linear-specific polynomial coefficients in a regression model. For categorical variables (sex and race/ethnicity), the *P* value to examine proportional differences in the categorical variable across the 3 NHANES cycles was calculated using a design-based likelihood ratio test (a complex survey data analog to the noncomplex survey data χ^2 test).

[c]The estimates across poverty level are from a reduced sample size because not all participants had income-to-poverty ratio data; among the 3946 participants, 3665 provided poverty data. An income-to-poverty ratio value of <1 was denoted as below the poverty level.

Survey (NHANES) to provide an assessment of children's physical activity behavior and to more clearly identify subpopulations for intervention efforts.

METHODS

Design and Participants

Data from 3 2-year cycles of the NHANES were used, starting in the period 2009 to 2010 and concluding in the period 2013 to 2014 (latest available cycle at the time of this writing). The NHANES is an ongoing survey conducted by the Centers for Disease Control and Prevention that uses a representative sample of noninstitutionalized US civilians selected by a complex, multistage, stratified, clustered probability design. Examination response rates across the 2009 to 2014 survey cycles were high: ranged from 79.4% to 87.6% for children (age, 6-11 years). Participants provided assent to participate, with study procedures approved by the National Center for Health Statistics' ethics committee. The analytic sample included 3946 children (age, 6-11 years). Only children are evaluated herein because the study variable of interest (days per week the participant engaged in 60 min/d of physical activity) was assessed only in this age group consistently across the 3 evaluated NHANES cycles.

Measurement of Physical Activity

Physical activity was reported by the child's parent. The specific physical activity parameter evaluated herein was identical across the 3 2-year cycles and included, "During the past 7 days, on how many days was your child physically active for a total of at least 60 minutes per day? Add up all the time your [child] spent in any kind of physical activity that increased his/her heart rate and made him/her breath hard some of the time." For this age (6-11 years), utilization of child recall of physical activity is not acceptable given children's limited cognitive ability to accurately recall their physical activity behavior. Although conceivably less accurate than objective measures of physical activity, parenting proxy-reporting methods of their child's physical activity have demonstrated some evidence of reliability and validity. For example, proxy reports of children's physical activity demonstrate a modest association with objectively determined activity monitor counts (r=0.41-0.60).[6] Notably, the specific physical activity measure used in this study has demonstrated acceptable validity (r=0.37-0.49).[7,8]

Statistical Analyses

All analyses, conducted in Stata (StataCorp, LP, v. 12), took into account the complex sampling