Physical Activity and Sedentary Behavior Among Schoolchildren: A 34-Country Comparison

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Objective To describe and compare levels of physical activity and sedentary behavior in schoolchildren from 34 countries across 5 WHO Regions.

Study design The analysis included 72,845 schoolchildren from 34 countries that participated in the Global School-based Student Health Survey (GSHS) and conducted data collection between 2003 and 2007. The questionnaire included questions on overall physical activity, walking, or biking to school, and on time spent sitting.

Results Very few students engaged in sufficient physical activity. Across all countries, 23.8% of boys and 15.4% of girls met recommendations, with the lowest prevalence in Philippines and Zambia (both 8.8%) and the highest in India (37.5%). The prevalence of walking or riding a bicycle to school ranged from 18.6% in United Arab Emirates to 84.8% in China. In more than half of the countries, more than one third of the students spent 3 or more hours per day on sedentary activities, excluding the hours spent sitting at school and doing homework.

Conclusions The great majority of students did not meet physical activity recommendations. Additionally, levels of sedentariness were high. These findings require immediate action, and efforts should be made worldwide to increase levels of physical activity among schoolchildren. *(J Pediatr 2010;157:43-49)*.

The health benefits of a physically active lifestyle are well known. They include a lower risk of obesity, coronary heart disease and stroke, type II diabetes as well as colon and breast cancer. Globally, more than 1.9 million deaths per year could be prevented if everybody was sufficiently physically active.[1-4]

It has been shown that physical activity during childhood and adolescence reduces the risk of childhood as well as adulthood obesity,[5-8] has a positive effect on blood pressure,[9] and is associated with emotional well-being.[10,11] Overall, health benefits from physical activity at a young age are likely to be similar to those in adults.[12,13] Given these findings, efforts to increase physical activity levels should be made in developed as well as developing nations.

Along with an increase of physical activity levels, sedentary behavior should be decreased. Many studies report that sedentary behavior increases the risk of obesity.[8,14-17] Special attention has been paid to the risks associated with large amounts of television viewing, which, research has shown, not only increases the risk of obesity, but also of poor fitness, smoking and raised cholesterol levels.[18]

Planning of effective interventions to increase physical activity levels and to decrease sedentary behavior in children requires baseline data that are already available for most European and North American countries, but are lacking for many developing countries.[12,19]

This analysis aimed to describe patterns of physical activity and sedentary behavior among 13- to 15-year-old schoolchildren from 34 mainly developing countries.

Methods

The Global School-based Student Health Survey (GSHS) was designed to assess health behaviors among 13- to 15-year-old schoolchildren. This self-administered survey was developed in 2001 by the World Health Organization (WHO) in collaboration with United Nations Childrens Fund, United Nations Education, Scientific and Cultural Organization, and United Nations Joint Programme on HIV/AIDS, and with technical and financial assistance from the United States Centers

AFR	WHO African Region
AMR	WHO Region of the Americas
CDC	United States Centers for Disease Control and Prevention
EMR	WHO Eastern Mediterranean Region
GSHS	Global School-based Student Health Survey
HBSC	Health Behavior in school-aged children
NHANES	National Health And Nutrition Examination Survey
SEAR	WHO South-East Asia Region
WHO	World Health Organization
WPR	WHO Western Pacific Region

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Table I. Survey year, coverage, response rate, sample size, and demographics, GSHS, 2003-2007

WHO Region	Country	Survey year	Coverage	Overall response rate* (%)	Analytical sample size† (% of 13-15 year old respondents)	% Boys in final sample	Mean age of final sample
AFR	Botswana	2005	National	95.0	1,264 (90.7)	45.7	14.4
AFR	Ghana	2007	National	83.4	3,403 (87.4)	51.6	14.2
AFR	Kenya	2003	National	83.5	2,219 (78.3)	46.2	14.1
AFR	Mauritius	2007	National	87.4	1,666 (93.3)	47.3	14.1
AFR	Namibia	2004	National	81.7	3,699 (84.8)	41.9	14.1
AFR	Senegal	2005	National	60.0	2,238 (92.6)	60.2	14.1
AFR	Seychelles	2007	National (census)	82.0	820 (87.9)	48.3	14.0
AFR	Uganda	2003	National	68.4	1,613 (83.2)	47.3	14.3
AFR	UR Tanzania (Dar-es-Salaam)	2006	Subnational	87.0	1,130 (91.2)	51.2	13.6
AFR	Zambia	2004	National	70.5	932 (71.2)	50.6	14.1
AFR	Zimbabwe (Harare)	2003	Subnational	84.0	1,297 (89.6)	46.0	14.2
AMR	Argentina	2007	National	77.1	1,404 (90.8)	45.7	14.2
AMR	Cayman Islands	2006-2007	National (census)	79.2	796 (85.0)	50.6	14.0
AMR	Chile (Metropolitan)	2004	Subnational	85.0	1,703 (96.1)	50.6	13.9
AMR	Colombia (Bogotá)	2007	Subnational	82.8	1,232 (97.9)	43.5	14.0
AMR	Ecuador (Quito)	2007	Subnational	85.6	1,267 (94.1)	49.7	13.9
AMR	Guyana	2004	National	80.0	975 (92.2)	46.2	14.1
AMR	Saint Lucia	2007	National	82.0	792 (91.3)	45.4	14.1
AMR	Saint Vincent and the Grenadines	2007	National	84.0	877 (83.3)	45.9	13.8
AMR	Trinidad and Tobago	2007	National	78.0	1,854 (87.6)	49.7	14.1
AMR	Uruguay	2006	National	71.2	2,287 (95.7)	45.0	14.1
AMR	Venezuela (Lara)	2003	Subnational	85.4	1,399 (92.7)	48.5	13.6
EMR	Djibouti	2007	National	83.3	882 (89.2)	59.6	14.4
EMR	Egypt	2006	National	87.0	3,664 (92.1)	53.9	13.5
EMR	Jordan	2004	National	95.0	1,719 (92.1)	48.2	14.4
EMR	Libyan Arab Jamahiriya	2007	National	98.0	1,354 (88.7)	50.3	13.9
EMR	Morocco	2006	National	84.0	1,735 (88.0)	53.4	14.1
EMR	Oman	2005	National	97.0	2,158 (93.5)	52.5	14.0
EMR	United Arab Emirates	2005	National	88.3	9,916 (91.3)	48.9	14.0
SEAR	India (CBSE)	2007	National	84.2	6,130 (90.1)	58.0	14.0
SEAR	Indonesia	2007	National	93.1	2,788 (97.0)	49.3	13.9
SEAR	Myanmar	2007	National	95.0	1,955 (97.8)	49.9	13.9
WPR	China (Beijing)	2003	Subnational	99.0	1,868 (96.4)	49.6	14.0
WPR	Philippines	2003	National	84.2	3,809 (86.9)	40.3	14.2
	Total			83.7	72,845 (90.0)	47.6	14.0

*Overall response rate, the product of school and student response rate, refers to the entire sample including those students outside the targeted age range of 13 to 15 years.
†Analytical sample size: respondents with complete data on age, sex, and all 5 variables of the physical activity module.

for Disease Control and Prevention (CDC).[20,21] A total of 72,845 schoolchildren from 34 countries that undertook a GSHS between 2003 and 2007 were included in the analysis. Country selection was based on voluntary participation in the survey.

Country samples were drawn using a standardized 2-stage design. For the first stage, schools were selected with probability proportional to size sampling. For the second stage, classes in which 13- to 15-year-olds were enrolled were randomly selected from these schools. Every student in selected classes, even those outside the targeted age range, was asked to participate in the survey.[20,21] To ensure that samples were comparable and representative of the targeted age group, analysis was restricted to 13- to 15-year-olds. All countries drew nationally representative samples with the exception of Chile (Metropolitan Region), China (Beijing), Colombia (Bogotá), Ecuador (Quito), United Republic of Tanzania (Dar-es-Salaam), Venezuela (Lara), and Zimbabwe (Harare). India drew a national sample from all Central Board of Secondary Education (CBSE) schools. Cayman Islands and Seychelles did a census of all schoolchildren aged 13 to 15 years, and Saint Vincent and the Grenadines selected classes within all schools of the country.

Data collection was conducted during one regular class period. Student privacy was protected through anonymous and voluntary participation, and informed consent was obtained as appropriate from the students, parents and/or school officials.

Countries put together their questionnaires by choosing from a range of modules with standardized questions. All questions used multiple choice response options and students recorded their responses on computer scannable answer sheets. Country questionnaires are available at the GSHS sections of the CDC and the WHO websites.[20,21] They were translated into the appropriate languages and pilot tested for comprehension.

The physical activity module included five questions and was divided into 3 sections: overall physical activity, sedentary behavior, and active transportation to and from school.

The first 2 questions on overall physical activity represented the PACE+ Adolescent Physical Activity Measure and have been tested for validity and reliability.[22] They asked about the number of days with physical activity of at least 60 minutes (herein referred to as "active days") during the past 7 days and during a typical week. Introductory statements to the questions included country specific examples of the