

PHYSICAL ACTIVITY

Today

“Communicating the Relevance of Research”

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This issue of *Physical Activity Today* focuses on studies related to physical activity and levels of body fat in adolescent populations.

The Question: Do the physical activity guidelines contribute to a low risk excess body fat in adolescents?

The Study

The 2008 Physical Activity Guidelines for Americans suggest that youth should engage in at least 60 minutes of moderate to vigorous physical activity (MVPA) each day. In this study, 3865 adolescents aged 12 to 17 years from 10 European cities were measured for body height and weight using a telescopic stadiometer and skinfold thicknesses at the triceps and subscapular sites using skinfold calipers. Body mass index (BMI) and body fat percentage were calculated from the measures. Age- and gender-specific BMI cutoff points were used to categorize participants into normal weight, overweight and obese adolescents. Accelerometers were used to measure levels of physical activity in terms of time spent in moderate and vigorous intensity. Moderate physical activity was defined as 500 counts per 15 seconds (equivalent to walking at 3 km/hour), whereas 1000 counts per 15 seconds defined vigorous physical activity. Statistical analyses calculated the optimal physical activity cutoff points for each level of intensity, and the amount of MVPA that was associated with normal weight, overweight, and obese categories.

The Results

Significant cutoff points associated with normal weight adolescents were 18-19 minutes of vigorous physical activity a day for boys and 10 minutes a day for

girls. The optimal cutoff points were also significant for MVPA time. These cutoff scores were 55-71 minutes a day of MVPA for boys and 56 minutes a day for girls. No significant cutoff points were found for moderate physical activity.

Relevance

Despite recommendations of physical activity for children and adolescents by various groups since 1988, the question of how much physical activity is necessary to prevent obesity in young people remains to be determined. In this study, the current recommended guidelines of 60 minutes a day of MVPA for youth were associated with reduced risk of overweight and obesity in European adolescents. Adolescents who exercised less than 60 minutes a day were at higher risk of excess body fat. The study was one of the first of its kind to quantify the amount of vigorous physical activity needed to reduce the risk of overweight/overfatness in youth.

Reference

Martinez-Gomez, D., Ruiz, J., Ortega, F., Veiga, O., Moliner-Urdiales, D., Mauro, B., Galfo, M., Manios, Y., Widhalm, K., Beghin, L., Moreno, L., Molnar, D., Marcos, A., & Sjostrom, M. (2010). Recommended levels of physical activity to avoid an excess of body fat in European adolescents. *American Journal of Preventive Medicine*, 39(3), 203-211.

The Question: How does physical activity and energy intake effect changes in adiposity of Hispanic adolescents?

The Study

Participants were 38 overweight Hispanic boys and girls. All were members of a nutrition and strength training intervention program with the purpose of preventing type-2 diabetes. Body compositions were determined through the use of Body Mass Index evaluation and DEXA scans to measure bone density. Energy intake was assessed through 24 hour recalls, 3-day diet records and 5-day food frequency counts. Energy intake measures were found to provide strong agreement between student reports and observations. Finally, physical activity (PA) was measured through accelerometers.

The Results

Increase in total PA was associated with a decrease in adiposity within this population. Interestingly, an increase in Moderate to Vigorous PA (MVPA) was only marginally associated with decreases in fat mass. This study suggests that total PA may correlate with adiposity in this population. The authors caution the reader that these results do not suggest that MVPA will have no effect on adiposity, but perhaps that this population may not well tolerate MVPA. Relative to energy intake, changes in overall intake were found to be individual

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specific and had no apparent effect on group change from pre to post intervention.

Relevance

With the obesity epidemic becoming a larger concern in our country and the medical cost of obesity and obesity-related health issues increasing, it is becoming more important than ever to determine efficient means of fighting this epidemic. This study suggests that total PA may be more important than MVPA in this population and that this population may be well served by promotions of total PA as opposed to MVPA experiences.

Reference

Byrd-Williams, C. E., Belcher, B. R., Spruijt-Metz, D., Davis, J. N., Ventura, E. E., Kelly, L., Berhane, K., Azen, S. & Goran, M. I. (2010). Increased physical activity and reduced adiposity in overweight Hispanic adolescents. *Medicine & Science in Sport & Exercise*. 42(3), 478-484.

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The Question: Can an after-school physical activity program impact fitness measures in young African American females?

The Study

African-American females aged 8-12 years were recruited from eight different elementary schools and participated in a 10-month after-school physical activity program led by school teachers (non-PE specialists). These students were compared to a control group (non-participants in the after-school program). Pre- and post- program cardiovascular fitness (VO2 Max) was evaluated in all participants via a graded treadmill test and body composition was determined by the following measures: waist circumference, body mass index (BMI), DXA (body fat %) and bone mineral density (BMD), and magnetic resonance imaging (visceral adipose tissue [VAT]). The after-school program took place 5 days/week with 5-6 days missed due to the school schedule. The program consisted of a 30-minute snack/homework time followed by 80 minutes of physical activity (25 minutes of skill instruction, 35 minutes of aerobic exercise, and 20 minutes of strengthening/stretching exercises). Participants wore heart rate monitors each day they attended.

The Results

Compared to the control group, the intervention group had a significant decrease in percent body fat, BMI, and VAT, as well as significant increases in BMD and cardiovascular fitness. Higher attendance was associated with greater increases in BMD and greater decreases in percent body fat and BMI. In addition, higher heart rates during physical activity were associated with greater increases in BMD and greater decreases in percent body fat. There was no significant difference between the control

and intervention groups in regards to waist circumference.

Relevance

Among non-Hispanic Black females aged 6 to 19 years, 43% have a BMI that falls at the 85th percentile or higher (Ogden et al., 2010¹). A structured after-school program targeting this identified risk group can be successful in lowering general and visceral adiposity and improving both bone density and cardiovascular fitness. In addition, classroom teachers in this study were able to successfully implement the after-school program when provided training and a toolkit to reference, suggesting that after-school physical activity programs do not always need to be led by the PE specialist. Lastly, the program was beneficial to girls of varying initial adiposity levels, indicating that such an intervention can also be beneficial in preventing the development of overweight.

¹Ogden, C., Carroll, M., Curtin, L., Lamb, M., & Flegal, K. (2010). Prevalence of high body mass index in US children and adolescents, 2007-2008. *JAMA: Journal of the American Medical Association*, 303 (3), 242-249.

Reference

Barbeau, B., Johnson, M.H., Howe, C.A., Allison J., Davis, C.L., Gutin, B., & Lemmon, C.R. (2007). Ten months of exercise improves general and visceral adiposity, bone, and fitness in black girls. *Obesity*, 15 (8), 2077-2085.

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LEARN MORE: Go to http://www.fitness.gov/enewsletter/Winter06_sciencenotes.htm to learn more about the status of physical activity in young African American females as well as the barriers they face.