Battling Obesity in K-12 Learners from an Exercise Physiology Perspective

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By appealing to students' natural curiosity, and using the tools embedded in various standards, teachers can impart vital knowledge about a healthful lifestyle.

Childhood obesity is among the hottest health topics today. Health and physical educators are in a unique position to tackle this problem, not just for children but for the adults they will become. In discussing the battle against obesity in K-12 learners from an exercise physiology perspective, we will focus on the practitioner and on the fact that practitioners already have the tools to battle this problem effectively, although they may not fully appreciate it. The tools are embedded in the national and state standards for physical education, in the national standards for beginning physical education teachers, and in the health and exercise science foundations of college teacher preparation programs. The purpose of this article is to demonstrate that the tools are all there and to implore teachers to use them. We will discuss these tools both from an exercise physiology perspective and in terms of our role in preparing teacher candidates to teach health and physical education in K-12 settings.

Everyone is familiar with the statistics on youth activity and fitness, which include the following:

- Children are 40 percent less active than they were 30 years ago. On average they watch over 26 hours of television and spend 30 hours sitting in school each week (U.S. Department of Health & Human Services, 2000).
- Childhood obesity has more than tripled in three decades (Mastrangelo, Chaloupka, & Rattigan, 2006).
- Childhood obesity affects critical health-related physical fitness components (in the study cited above, obese subjects perform significantly lower on the mile run/walk [MR/W] test and on measures of VO_2 peak as estimated from MR/W time, age, gender, and body mass index).
- Studies show that children and adolescents are developing type 2 diabetes, high blood cholesterol, and high blood pressure at rates that greatly raise their risk of heart disease (American Diabetes Association, 2000).
- Atherosclerosis is now known to begin in childhood and progress into adulthood, leading to heart disease, which is the single largest cause of death in the United States.

In the fight against obesity, physical education practitioners and programs have both an opportunity and an obligation to help children become physically educated, healthy, and active adults (National Association for Sport and Physical Education [NASPE], 2004b). Well-prepared beginning physical education teachers and master physical educators are able to teach and motivate students to develop health- and skill-related components of fitness as well as a variety of motor skills. In doing so, effective teachers also make sure that students develop in all educational domains—psychomotor, cognitive, and affective (NASPE, 2007). Students in an effective physical education and health program participate in a variety of activities

Photos by Peter Rattigan

Having students take their pulse after a run is one simple way to begin incorporating exercise physiology into the curriculum.

that develop fitness, can explain why these activities develop fitness and the basic science behind it, and value physical activity as part of healthful living (NASPE, 2004b). Education is becoming standards-driven, and physical education is no exception. Well-prepared physical educators in good programs will be very effective if they follow these standards. Standards provide tools for battling obesity in K-12 physical education. The following sections list the tools that beginning and veteran teachers have available to fight this battle. These include not only standards, but the interest that students bring to classes—interest that teachers ignore at their and their students' peril, and that effective teachers nurture and use to their students' benefit.

The Tools in the National Standards

The NASPE national standards (2004a) two, three, four, and six provide different objective domains that teachers can address in the battle against childhood obesity. The examples listed below are only from standard four, which states, "A physically educated person achieves and maintains a health enhancing level of physical fitness" (p. 11).

In grades K-2 (p. 34), a physically educated person:

• "Engages in a series of locomotor activities…without tiring easily."

• "Participates in a variety of games that increase breathing and heart rate."

• "Recognizes that health-related physical fitness consists of several different components."

In grades 3-5 (p. 35), a physically educated person:

• "Participates in selected activities that develop and maintain each component of physical fitness."

• "Recognizes that physiological responses to exercise are associated with their own levels of fitness."

• "Meets the age- and gender-specific health-related fitness standards defined by Fitnessgram."

In grades 6-8 (p. 36), a physically educated person:

• "Self-assesses heart rate before, during, and after vigorous physical activity."

• "Demonstrates appropriate training principles and exercise techniques during participation in activities designed to improve physical fitness."

• "Formulates meaningful personal fitness goals based on the results of Fitnessgram testing."

In grades 9-12 (p. 37), a physically educated person:

• "Assesses physical fitness status in terms of cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition."

• "Designs and implements a personal fitness program based on information obtained from the fitness assessment and in accordance with appropriate training principles."

• "Demonstrates [the] ability to monitor and adjust a personal fitness program to meet needs and goals."

There are many sample outcomes listed for this standard, and in the other standards identified earlier, that are not included above. The point here is that physical educators have been provided with tools to battle obesity related to the cognitive, affective, and psychomotor outcomes delineated in the NASPE standards. Good teachers use these tools to be effective; all teachers should be using them, or using their state standards. State standards may include both health and physical education. For example, the "New Jersey Core Curriculum Content Standards for Comprehensive Health and Physical Education" (New Jersey Department of Education, 2004) include progress indicators such as the following:

• 4th grade: "Develop a health-related fitness goal and use technology to track fitness status" (p. B-33).

• 8th grade: "Describe ways to achieve a healthy body composition through healthy eating and physical activity" (p. B-34).

• 12th grade: "Use health data to make predictions about

wellness and recommend behavior changes to improve lifelong wellness" (p. B-12).

In preparing health and physical educators to teach in New Jersey (and other states with joint certification or standards), teacher educators incorporate all elements of wellness, including nutrition, in order to maximize K-12 student decisions regarding healthful living. Physical educators in states that do not combine health and physical education in their standards or certification need to recognize that there are other tools beyond physical activity that students need in order to battle obesity, and they should find ways either to incorporate these into their physical education classes or to work with the health education teachers and curriculum to connect these tools to wellness (Biren & Rattigan, 2006).

The Beginning Teacher Standards

Quality physical educators should have the content knowledge, skills, and dispositions to teach students to value and choose a physically active and healthy lifestyle (NASPE, 2003, 2007). A small sampling of standards for beginning physical education teachers (NASPE, 2003) is listed below for standard one (content knowledge), standard four (management and motivation), and standard seven (assessment):

- 1.3: "Describe performance concepts and strategies related to skillful movement and physical activity (e.g., fitness principles…)" (p. 7).
- 1.4: "Describe and apply bioscience (anatomical, physiological, biochemical) and psychological concepts to skillful movement, physical activity, and fitness" (p. 8).
- 4.3: "Use a variety of developmentally appropriate practices…to motivate school age students to participate in physical activity inside and outside of the school" (p. 11).
- 7.3: "Involve students in self- and peer assessment" (p. 16).

The idea in these standards is that, among other things, teachers know the principles underlying physical activity and health and that they teach this to their students. Effective teacher preparation programs should follow the NASPE guidelines for teaching exercise science to teacher candidates (NASPE, 2006).

Questions in the Minds of Children and Youths

All students have a vested interest in their bodies! We have found that students ask questions that indicate they are interested in the principles that will, among other things, help them to make healthy lifestyle decisions. Listed below are some actual questions asked by students. Effective teachers should be able to help students find the answers and use this curiosity to keep students motivated:

- "Why do my legs hurt (burn) when I run really fast, but not when I run slowly?" (3rd grade)
- "What are steroids and why are they bad?" (3rd grade)
- "My grandma broke her hip. How can she make it strong?" (5th grade)
- "What type of exercise should I do to lose weight?" (6th grade)

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A teacher candidate conducts a blood pressure lab.

- "How come no matter how hard I work out, my friend is still stronger than me?" (9th grade)
- "Does creatine really work? What does it do?" (10th grade)
- "How come I still breathe heavily and sweat a lot after I am done with my workout?" (10th grade)
- "What should I eat before my football game?" (11th grade)
- "Why are my muscles sore two days after lifting weights? Is it that lactic acid stuff?" (11th grade)
- "Do body builders and power lifters train the same way? Why do they train differently?" (12th grade)

Taking Exercise Physiology into the Schools

In order to promote behavioral change in students, we must educate them in the "why" and "how" of change. We must foster in students excitement about caring for their body. Teacher educators at Rowan University attempt this by inspiring teacher candidates to teach about the science of exercise and a healthy lifestyle and by having them create lesson plans and teach them in area schools. Classes that teacher candidates have taken into the area schools include "Them Bones," "My Aching Heart," and "Healthy Eating." Our teacher candidates have also conducted heart rate, blood pressure, and respiratory labs. We have also brought students from area schools to the labs to show them how exercise science is conducted in higher education.

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Battling the Bulge with the Bottom Line

Effective teachers know and teach exercise science and other factors that underlie a healthy, active lifestyle and battle hypokinetic diseases such as obesity. At the same time, they need to inform students rather than scare them, to inspire rather than preach, and to be inclusive rather than exclusive. They are not training athletes, but educating active, healthy citizens. Teachers should be careful with how they portray body composition. Everyone's body is different. Children need to be taught to accept their body, not *force* it into a certain percent body fat or BMI, or give up on it if it cannot achieve that measure. Students need to know that a person can have a higher percent body fat and still be healthy through a healthy diet and an active lifestyle, and that a person can have a lower percent body fat and still be unhealthy due to an unhealthy diet and a sedentary lifestyle.

The real focus *must* be on physical activity levels, nutrition, and lifestyle, and not just on percent body fat or weight. If teachers focus on percent body fat or BMI, they will send the wrong message to students about their body and how to care for it. Students need to know and be able to do what makes them healthy. Of course, they should know what a "healthy" body weight or composition is. However, the critical thing is to know how to eat healthy, what to do to improve health fitness, and that eating this way and doing these things *will* lead to better health, no matter what those "other numbers" say.

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