Walking to School Could Reduce Stress Reactivity in Children and May Curb Risk of Heart Disease, Study Shows

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(PhysOrg.com) -- A simple morning walk to school could reduce stress reactivity in children during the school day, curbing increases in heart rate and blood pressure that can lead to cardiovascular disease later in life, according to a new University at Buffalo study.

UB researchers report in the August 2010 issue of Medicine & Science in Sports & Exercise that children who took a simulated walk to school later experienced smaller elevations in systolic blood pressure, heart rate and perceived stress while taking a short exam than children who had gotten a simulated ride to school.

Cardiovascular reactivity -- including changes in heart rate and blood pressure due to stress -- is associated with the beginnings of cardiovascular disease in children, and atherosclerosis -- the dangerous build-up of cholesterol, calcium, fat and other substances in artery walls -- in adults.

"The cardiovascular disease process begins in childhood, so if we can find some way of stopping or slowing that process, that would provide an important health benefit," says James Roemmich, UB associate professor of pediatrics and exercise and nutrition science and senior investigator on the study, which he completed with graduate students Maya Lambiase and Heather Barry. "We know that physical activity has a protective effect on the development of cardiovascular disease, and

one way it may be doing so is by reducing stress reactivity."

Roemmich says because it's not known how long the protective effect of a bout of exercise lasts, parents and educators should promote active play time throughout the day.

"If it only lasts a couple of hours, then it would be most beneficial if a child walked or biked to school, then had recess during school, as well as a break at lunch, so they had opportunities for physical activity throughout the day," Roemmich says. "This would put them in a constantly protective state against stressors that they're incurring during the school day, whether that be taking an exam, trying to fit in with peers or speaking in front of classmates."

Roemmich says his study is the first to show that moderate-intensity exercise can reduce children's cardiovascular reactivity during later, stressful activities. The research builds on his earlier work, which demonstrated that higher-intensity interval exercise could afford similar protection in children.

In the more recent investigation, Roemmich and his team examined a group of 20 boys and 20 girls, all Caucasian and ages 10-14. All visited the Behavioral Medicine Research Laboratory in the morning. To simulate a ride to school, half sat in a comfortable chair and watched a 10-minute slide show of images of a suburban neighborhood, ending with an image of a suburban school. The other half performed a one-mile walk on a treadmill at a self-selected pace, wearing a book bag containing 10 percent of their body weight. As they walked, the images of the suburban neighborhood were projected onto a screen.

Following a 20-minute rest period after completing the passive and active commutes, all children took a Stroop test, which asks subjects to correctly identify the color of color names printed in the wrong color

(the word "green" printed in blue ink, for instance). On average, during this activity, heart rate increased by about three beats per minute in children who walked, compared with about 11 beats per minute in children who "rode" to school. Similarly, the rise in systolic blood pressure was more than three times higher, and the change in perceived stress about twice as high, for the passive commuters.

"The perception of a stressor as a threat is the beginning of the stress reactivity process, so if you can dampen that initial perception, then you reduce the magnitude of the fight-or-flight response," Roemmich says. "This results in lower heart rate and blood pressure responses to the stressor. Exercise helped dampen even the initial response."

Provided by University at Buffalo