

Effects of an exercise program on hepatic metabolism, hepatic fat, and cardiovascular health in overweight/obese adolescents from Bogotá, Colombia (the HEPAFIT study): Study protocol for a randomized controlled trial

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Background: A considerable proportion of contemporary youth have a high risk of obesity-related disorders such as cardiovascular disease, metabolic syndrome, or non-alcoholic fatty liver disease (NAFLD). Although there is consistent evidence for the positive effects of physical activity on several health aspects, most adolescents in Colombia are sedentary. It is, therefore, important to implement strategies that generate changes in lifestyle. The HEPAFIT study aims to examine whether a 6-month exercise program has benefits for hepatic fat content and cardiovascular health outcomes among overweight/obese adolescents from Bogotá, Colombia. **Methods/design:** Altogether, 100 hundred overweight/obese, sedentary adolescents (aged 11-17 years) attending two public schools

in Bogotá, Colombia, will be included in a parallel-group randomized controlled trial. Adolescents will be randomly assigned to an intervention group following one of four curricula: (1) the standard physical education curriculum (60 min per week of physical activity, n = 25) at low-to-moderate intensity; (2) a high-intensity physical education curriculum (HIPE, n = 25), consisting of endurance and resistance games and non-competitive activities, such as running, gymkhanas, lifting, pushing, wrestling, or hauling, for 60-min sessions, three times per week, with an energy expenditure goal of 300 to 500 kcal/session at 75-85% maximum heart rate (HRmax); (3) a low-to-moderate intensity physical education curriculum (LIPE, n = 25) consisting of endurance and resistance games and non-competitive activities (e.g., chasing, sprinting, dribbling, or hopping) for 60-min sessions, three times per week with an energy expenditure goal of 300 kcal/session at 55-75% HRmax; and (4) a combined HIPE and LIPE curriculum (n = 25). The HIPE, LIPE, and combined interventions were performed in addition to the standard physical education curriculum. The primary outcome for effectiveness is liver fat content, as measured by the controlled attenuation parameter 1 week after the end of the intervention program. Discussion: The translational focus may be suitable for collecting new information in a school setting on the possible effects of physical activity interventions to reduce liver fat content and to improve metabolic profiles and the cardiometabolic health of overweight/obese adolescents. This may lead to the more efficient use of school physical education resources. © 2018 The Author(s).

Exercise

Fatty liver

Metabolic syndrome

Obesity

Overweight

Risk factor

adolescent

adolescent obesity

Article

cardiovascular disease

Colombia

controlled study

endurance training

energy expenditure

exercise

fatty liver

human

lifting effort

liver metabolism

parallel design

physical activity

physical education

randomized controlled trial

randomized controlled trial (topic)

resistance training

running

single blind procedure

wrestling

adipose tissue

age

blood

body weight loss

child

childhood obesity

health status

healthy lifestyle

liver

metabolism

obesity

pathophysiology

procedures

school health service

time factor

treatment outcome

biological marker

Adipose Tissue

Adiposity

Adolescent

Age Factors

Biomarkers

Child

Colombia

Exercise

Health Status

Healthy Lifestyle

Humans

Liver

Pediatric Obesity

Physical Education and Training

Randomized Controlled Trials as Topic

School Health Services

Single-Blind Method

Time Factors

Treatment Outcome

Weight Loss