

Exercise dose on hepatic fat and cardiovascular health in adolescents with excess of adiposity

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Abstract

Objective: The HEPAFIT study was aimed at examining the impact of a 6-month physical education intervention, considering various levels of exercise intensity, on hepatic fat and cardiometabolic health outcomes in adolescents with excess adiposity. **Methods:** Adolescents ($n = 120$), 11–17 years with excess adiposity by body fat $>30\%$, were randomly assigned to one of the following 4 groups for 6 months: (1) standard physical education lessons, control (CTRL); (2) high-intensity physical education (HIPE); (3) low-to-moderate intensity physical education (LIPE) and (4) combined HIPE and LIPE (PLUS). The primary outcome was hepatic fat content measured by vibration-controlled transient elastography (controlled attenuation parameter [CAP]). Secondary outcomes were traditional cardiovascular health markers (body composition, serum lipids, aminotransferases and health-related physical fitness components). **Results:** Adjusted mixed effects linear models revealed a significant decrease in CAP levels in HIPE (-20.02 dB/m, $p < 0.0001$) ($p = 0.001$ vs. CTRL group) and PLUS (-16.25 dB/m, $p = 0.005$) groups. Body fat decreased in the HIPE (-2.88% , $p < 0.001$) ($p = 0.001$ vs. CTRL group) and LIPE (-1.26% , $p = 0.022$) groups. The physical fitness components were increased in the HIPE and PLUS group relative to the baseline ($p < 0.05$), and the HIPE group showed a reduction in the total cholesterol and low-density lipoprotein cholesterol (LDL-C) levels ($p < 0.05$). **Conclusions:** Implementation of a 6-month physical education exercise program, particularly high-intensity or combined high and low-intensity, improves hepatic fat storage and significantly reduces cardiometabolic markers in adolescents with excess of adiposity. Interventions involving supervised physical exercise may help to improve metabolism and fat deposition at the hepatic level, thus preventing the development of non-alcoholic fatty liver disease in adolescents. © 2021 World Obesity Federation

Author keywords

insulin resistance; metabolism; non-alcoholic fatty liver disease; physical activity