

### Determinant factors of physical fitness in children with congenital heart disease

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**Introduction:** Advances in the treatment of children with congenital heart disease (CHD) have resulted in notable improvements in survival and life expectancy. Thus, attention has shifted from mortality and cardiac morbidity to long-term cardiovascular and psychosocial health, which are best predicted by physical fitness.

**Objective:** To determine factors associated with physical fitness in children who underwent surgery for CHD.

**Methods:** Sixty-six children (6-14y) who underwent surgery for ventricular septal defect (n=19), coarctation of aorta (n=10), tetralogy of fallot (n=15) and transposition of great arteries (n=22) were included. All children performed physical fitness tests: cardio-respiratory fitness, upper and lower-limb muscular strength, balance, flexibility and speed. Cardiac evaluation was done via echocardiography and cardio-pulmonary exercise test. Determinant factors related to child's characteristics (sex, age, body mass index), child's lifestyle (breakfast habit, fruit and vegetable consumption, dietary fat and sugar propensity, screen time, physical activity, quality-of-life), physical activity motivators/barriers and parental factors (socio-economic status, body mass index) were obtained. Multivariate (six fitness components together as outcome) and linear regression analyses were conducted, adjusted for CHD lesion type.

**Results:** No differences in physical fitness performance nor in any of the tested determinant factors were observed according to CHD lesion type. Age and sex were the only factors associated with physical fitness in children with repaired CHD (partial  $\eta^2$  squared= 0.797,  $p < 0.001$ ; partial  $\eta^2$  squared= 0.567,  $p = 0.008$ ) respectively. Older children performed better than younger in muscular strength and balance and less in cardio-respiratory fitness. Sex and motivations showed an association with some physical fitness components. Boys had better cardio-respiratory fitness ( $p = 0.007$ ), whereas girls were better in flexibility ( $p = 0.017$ ) and balance ( $p = 0.041$ ). Age, sex and motivators together reached an adjusted  $R^2$  0.444 for speed, 0.484 for lower muscular strength, 0.707 for upper muscular strength, 0.021 for flexibility, 0.149 for balance and 0.382 for CRF. Adding other possible determinants did not significantly increase the adjusted  $R^2$ .

**Conclusions:** Children with different repaired CHD lesions did not differ in physical fitness or activity. Apart from age and sex as non-modifiable determinants, motivation for physical activity seems the only relevant target to increase fitness in this patient group.