Physical performance, physical activity, body composition and exercise training in adults with congenital heart disease

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Akademisk avhandling

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Abstract

Background Adults with congenital heart disease (CHD) is a growing population and related to advances in surgical and medical treatment, they now outnumber the children with corresponding lesions. Since a congenital heart lesion often results in reduced exercise capacity, this population is a potential target for physiotherapy. To what extent this reduction in exercise capacity is caused by abnormal cardiovascular anatomy and physiology or to what degree insufficient physical activity contributes is not known. To support the advancements in paediatric cardiac care, increased knowledge regarding physical performance, physical activity level, body composition and the effects of exercise training among adults with CHD is required.

Methods In a cross-sectional study skeletal- and respiratory muscle function, physical activity level and exercise self-efficacy was investigated among 85 adults with various forms of CHD and 42 control subjects. A second study was conducted to analyse height, weight and body mass index (BMI) in 538 adults with complex CHD and 1886 adults with simple CHD. Data were extracted from the Swedish registry on congenital heart disease (SWEDCON) and compared to data from a national population survey. In a third study, factors associated with self-reported quality of life (QoL) were analysed using SWEDCON data on 315 adults with congenital aortic valve disease. Finally, a randomised controlled trial was conducted to investigate the effects of interval exercise training among adults with complex CHD.

Results Adults with complex CHD showed impaired muscle function compared to both patients with simple CHD and controls. In addition, patients with complex CHD had a lower exercise self-efficacy compared to controls. Patients with CHD were equally active at moderate-to-vigorous level as the controls. However, approximately 50% of both patients and controls failed to reach the recommended physical activity level. In general patients with CHD had the same height, weight and BMI, as the general population. However, compared to the general population, men with CHD were more commonly underweight and less commonly overweight/obese. Additionally, especially male patients with complex CHD were shorter compared to the general population. Among adults with congenital aortic valve disease, a higher physical activity level was associated with better QoL. Furthermore, interval training increased exercise capacity and endurance among adults with complex CHD.

Conclusion A higher physical activity level was associated with better self-reported QoL in patients with congenital aortic valve disease which implies that QoL might be possible to improve, by adopting a physically active life-style. Adults with CHD were equally active as controls at a moderate-to-vigorous physical activity level. However, approximately half of both groups were insufficiently physically active based on current recommendations. This indicates that low physical activity, on group level, does not explain the lower exercise capacity commonly found among patients with CHD. In addition, this is consistent the finding that the majority of patients followed the same pattern regarding BMI as seen in the general population. However, impaired muscle function in combination with the shorter stature and higher prevalence of underweight found in men, especially with complex CHD, implies an altered body composition in this group. The findings of the present thesis suggests an indication for physiotherapy targeting increased physical activity level and individualized exercise training in this patient population. Moreover, regular evaluation of muscle function, exercise self-efficacy and QoL, in addition to exercise capacity, might be useful for monitoring disease development over time.

Keywords

Congenital heart disease, adult, muscle function, physical activity, height, weight, BMI, quality of life, exercise capacity, exercise training.