

MP1-9

Wearable-based physical activity assessment in children with congenital heart disease

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Objectives: Still, physical activity (PA) is low in children with congenital heart disease (CHD). Wearables, validated devices to assess daily PA in children is used in this study to compare PA in CHD patients to healthy peers (step-count and moderate to vigorous physical activity (MVPA)) and whether they follow the WHO criteria of at least 60 minutes of per day.

Methods: From September 2017 to September 2018, 84 young patients (11.0 ± 3.9 years, range: 5.9-17.6 years, 32 girls) with various congenital heart diseases (CHD) participated in a wearable-based PA assessment, recorded with the Garmin vivofit® jr for seven consecutive days. Step-count and MVPA were calculated and compared to a healthy reference cohort (RC) of 86 children (11.0 ± 3.9 years, 45 girls) via Student's T-test for independent samples.

Results: Children with CHD showed a lower step-count (CHD: $10,052 \pm 3,354$ steps/day vs. RC: $11,822 \pm 3,635$ steps/day, $p < .001$) and lower MVPA (CHD: 73.4 ± 24.9 MVPA minutes/day vs. RC: 84.2 ± 25.1 MVPA minutes /day, $p = .010$) compared to healthy peers. Comparisons of MVPA throughout the week highlighted no significant difference during weekdays while on the weekend CHD reached lower levels of MVPA (CHD: 64.4 ± 30.0 MVPA minutes /weekend-day vs. RC: 78.6 ± 32.6 MVPA minutes/weekend-day, $p = .003$). According to WHO criteria, 71.4% of CHD reached the recommended 60 minutes MVPA per day on a weekly average.

Conclusions: The current study shows that children with CHD still have a lower step-count and MVPA in daily life compared to their healthy peers. Nevertheless, though the majority is sufficiently active, an active lifestyle still needs to be promoted.