

Associations between 24-h Movement Behaviours and Cardiovascular Health Indicators in Adolescents Living with Type 1 Diabetes: A Novel Compositional Data Analysis

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Background Type 1 diabetes (T1D) is linked with high risks of cardiovascular disease (CVD). The research addressing the association between the composition of these movement behaviours and cardiovascular health indicators, while acknowledging the compositional nature of them, is inadequate.

Objectives Our objective is to use compositional data analysis to investigate the associations between 24-h movement behaviours and cardiovascular health indicators in adolescents living with T1D.

Methods This cross-sectional study included 33 adolescents living with T1D and 16 their peers without T1D. Participants wore a waist-worn accelerometer for 7 days, which determined aggregate durations of time spent in sleep, SB, LIPA and MVPA. Cardiovascular health indicators included body mass index (BMI), and lipid profiles. We used multiple linear regression in conjunction with a compositional data analysis approach, which is based on isometric log-ratio transformation, to determine these relationships.

Results In adolescents living with T1D, we found time spent in sleep, relative to the other behaviours, was positively associated with BMI ($\beta = 4.52$; $p = 0.0247$) when adjusted for age, sex, and pubertal stages, whereas time engaged in LIPA, relative to other behaviours, was negatively associated with BMI ($\beta = -4.17$; $p = 0.0027$).

Conclusion In adolescents living with T1D, increased sleep and decreased LIPA have negative consequences in cardiovascular health. Optimizing these behaviours may lead to better cardiovascular health indicators in these individuals.