Turn off and turn in: the influence of television viewing and sleep on lipid profiles in children.

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Background

• Physical activity is beneficial to lipid profiles, however the association between sedentary behaviors and pediatric dyslipidemia remains controversial.

• Understanding these associations is critical given that youth are increasingly engaging in sedentary pursuits, and are sleeping, on average, 1 hour less that children were 20 years ago.

• The aim of our study was to investigate whether various forms of sedentary behavior/sleep predict lipid profiles in children over a 2-year period.

Methods

• Data from 630 children living in Quebec, Canada, with at least one biological parent with obesity (QUALITY cohort) were collected at both 8-10 years (time 1) and 10-12 years (time 2).The characteristics of the cohort appear in Table 1.

• Sedentary behavior, sleep time and moderate-to-vigorous physical activity (MVPA) were measured over 7 days using accelerometry. Sleep time was derived from accelerometer non-wear time. Screen time, including computer/video game use and TV viewing over the past 7 days were self-reported. Fitness was measured by VO2peak; %fat mass (PFM) was measured by DXA. Dietary composition was measured using 3 non-consecutive dietary recalls.

• Outcomes included fasting total cholesterol, triglycerides, HDL-cholesterol and LDL-cholesterol. Multivariable regression models included baseline MVPA, fitness, adiposity and diet, and adjusted for baseline age, sex and season (models with MVPA) and time 2 Tanner stage.

Results

Table 1: Baseline characteristics of the cohort (QUALITY cohort)

Characteristics	Boys (n=221)	Girls (n=195)
Age (years), mean (SD)	9.7 (0.9)	9.7 (0.9)
Waist Circumference (cm), mean (SD)	67.5 (12.1)	68.3 (12.3)
BMI Z-score, mean (SD)	0.7 (1.0)	0.7(1.1)
BMI category, % (n)		
Underweight	1.8 (4)	2.0 (4)
Normal Weight	56.6 (125)	54.4 (106)
Overweight	21.3 (47)	18.5 (36)
Obese	20.4 (45)	25.1 (49)
Tanner Stage, % (n)		
Pre-pubertal	88.7 (196)	60.5 (118)
Pubertal	11.3 (25)	39.5 (77)
Percent fat mass , median (IQR)	21.7 (14.6, 32.2)	31.2 (21.4, 38.3)
Total Energy Intake/day (kcal), median (IQR)	1733 (1485, 2002)	1535 (1312, 1751)
Percent fat intake (%), median (IQR)	32.0 (29.0, 35.1)	32.6 (29.5, 35.2)
High Sugar Drinks (ml), median (IQR)	83.2 (0, 212.4)	66.7 (0, 166.3)
Fitness, (ml·kg LBM^{-1}·min^{-1}), mean (SD)	60.6 (5.9)	57.4 (5.9)
MVPA, (min/day), median (IQR)	56.7 (39.4, 72.1)	36.7 (28.0, 53.0)
Sedentary Behavior (min/day), median (IQR)	367 (309, 407)	369 (325, 405)
Screen time (hrs/day), median (IQR)	2.6 (1.6, 4.1)	1.8 (1.1, 3.1)
TV time (hrs/day) , median (IQR)	1.6 (1.0, 2.5)	1.3 (0.8, 2.3)
Computer Time (hrs/day), median (IQR)	0.8 (0.4, 1.5)	0.4 (0.07, 0.9)
Sleep Time (hrs/day), median (IQR)	10.3 (10.0, 10.9)	10.4 (10.1,10.9)

Table 3: The effect of Sleep on LDL-cholesterol levels using Multivariable Linear Regressions (QUALITY cohort)

Multivariate analysis without adiposity and without diet	LDL-cholesterol ß (95% CI)	*p*-value
Sedentary time by Accelerometer (10 min /day)	-0.3 (-0.8, 0.2)	0.247
MVPA (10 min/day)	-0.2 (-1.5, 1.2)	0.829
Fitness (ml·kg LBM^{-1}·min^{-1})	-0.4 (-0.9, 0.007)	0.098
Sleep Time (hours/day)	**-5.1 (-9.0, -1.2)**	**0.011**
R-squared	0.03	
Multivariate analysis with adiposity and diet		
Sedentary time by Accelerometer (10 min /day)	-0.2 (-0.7, 0.2)	0.254
MVPA (10 min/day)	0.2 (-1.2, 1.6)	0.827
Fitness (ml·kg LBM^{-1}·min^{-1})	-0.4 (-0.9, 0.06)	0.085
Sleep Time (hours/day)	**-4.1 (-7.9, -0.3)**	**0.033**
PFM (%)	**0.5 (0.2, 0.7)**	**0.001**
Dietary fat (g)	0.006 (-1.0, 1.0)	0.991
R-squared	0.05	

Table 2: The effect of TV time on childhood triglycerides and HDL levels using multivariable linear regressions (QUALITY cohort)

Multivariate analysis without adiposity and without diet	Triglycerides ß (95% CI)	*p*-value	HDL ß (95% CI)	*p*-value
MVPA (10 min/day)	**-2.7 (-4.8, -0.5)**	0.017	**1.5 (0.5, 2.5)**	**0.0003**
Fitness (ml·kg LBM^{-1}·min^{-1})	-0.07 (-0.9, 0.8)	0.879	0.1 (-0.3, 0.5)	0.57
TV Time (hours/day)	**7.4 (3.9, 10.9)**	**< 0.0001**	**-2.1 (-3.7, -0.5)**	**0.009**
Sleep Time (hours/day)	-2.1 (-8.6, 4.5)	0.539	-0.4 (-3.4, 2.6)	0.783
R-squared	0.09		0.09	
Multivariate analysis with adiposity and with diet				
MVPA (10 min/day)	-1.6 (-3.7, 0.6)	0.157	0.8 (-0.1, 1.8)	0.089
Fitness (ml·kg LBM^{-1}·min^{-1})	-0.2 (-1.0, 0.6)	0.618	0.2 (-0.2, 0.5)	0.375
TV Time (hours/day)	**5.5 (2.0, 8.9)**	**0.002**	-1.0 (-2.5, 0.5)	0.198
Sleep Time (hours/day)	-0.4 (-6.8, 5.9)	0.896	-1.3 (-4.1, 1.6)	0.383
PFM (%)	**1.4 (0.9, 1.9)**	**< 0.0001**	**-0.8 (-1.0, -0.6)**	**< 0.0001**
Dietary carbohydrate (g)	0.2 (-0.5, 1.0)	0.513	-0.2 (-0.5, 0.1)	0.214
Sugar Sweetened Beverages (mls)	0.02 (-0.02, 0.05)	0.286		
R-squared	0.17		0.21	

Conclusions

• Higher time spent engaged in TV watching and lower sleep appear to be deleterious to childhood lipid profiles over time, even when taking into account other major lifestyle habits.

• Promotion of increased sleep time and decreased TV viewing might be effective strategies to prevent cardiovascular disease in youth.

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Fat 1

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