OBJECTIVELY MEASURED MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY, SEDENTARY BEHAVIOUR AND ADIPOSITY IN YOUTH FROM RURAL COMMUNITIES

13th Annual Meeting and 8th Conference of HEPA Europe
15TH – 17TH NOVEMBER 2017, ZAGREB, CROATIA

Aristides M. Machado-Rodrigues[1,2], Manuel J. Coelho-e-Silva[1], Rômulo Fernandes[3], Luís P. Mascarenhas[4], Cristina Padez[1]; Jorge Mota[5]

[1] University of Coimbra, Portugal;
[2] High School of Education, Polytechnic Institute of Viseu, Portugal.
[3] Universidade Estadual de São Paulo, Presidente Prudente, Brasil;
[4] Departamento de Pediatria, Universidade Federal do Paraná, Curitiba, Brasil;
[5] Research Centre of Physical Activity, Leisure and Health, University of Porto, Portugal.

Background

Research on relationships between lifestyle behaviours and adiposity in school youth from less studied communities (i.e. rural settings) is potentially important for identifying subgroups at risk. Indeed, rural areas, with relatively low population densities, are characterized by socioeconomic and educational inequities that can impact on health of youth. The aim of the present study was twofold: i) to compare the moderate-to-vigorous physical activity (MVPA), sedentary behaviour (SB), and adiposity between boys and girls from rural settings; ii) evaluates the associations among waist circumference (WC) and objective measures of SB in a sample of rural adolescents.

Methods

The sample included 254 students (114 boys, 140 girls), 13-16 years of age, from rural regions of the Portuguese midlands. Height, weight, and WC were measured. Cardiorespiratory Fitness (CRF) was assessed with the 20-m shuttle-run test. An uniaxial GT1M accelerometer was used to obtain five consecutive days of MVPA and SB. One-way analysis of covariance (ANCOVA) was used to test the effect of sex on the afore-mentioned behavioral variables, controlling for chronological age. In addition, multiple linear regression was used to test associations between WC and SB, adjusted for several potential confounders (age, sex, PA, CRF, parental education).

Results

Rural boys spend significantly more time than girls in PA and MVPA on both week and weekend days, whereas girls spend significantly more time than boys in SB on week days and the total of five measured days. Rural boys also have significantly higher levels of CRF than girls. SB was not significantly associated with the WC, neither in the unadjusted model nor after adjustment for all potential confounders. In the final model, the unique significant predictor of the WC was cardiorespiratory fitness (β=-0.82; 95% CI, -1.02 to -0.62).

Table 1. Descriptive statistics and results of Ancovas (chronological age as co-variable) of the effect of sex on body size, and behavioural variables.

Variables	Boys (N=114) Mean ± SD	Girls (N=140) Mean ± SD
Antropometry:		
Chronological age, years	14.3±1.1	14.3±1.0
Height, cm	165.1±8.9	158.2±6.4 **
Weight, kg	56.6±11.6	53.5±10.0 **
WC, cm	76.5±8.2	77.2±7.7
BMI, kg. m^{-2}	20.62±3.19	21.34±3.53
Physical activity/Sedentary behaviour:		
MT (week days), min/day	888.9±51.4	890.4±56.7
MT (weekend days), min/day	789.8±77.8	783.2±75.1
MT (total of 5 days), min/day	849.2±47.3	847.4±49.5
SB[a] (week days), min/day	725.7±61.0	743.4±60.7 **
SB[a] (weekend days), min/day	670.9±84.5	676.2±80.2
SB[a] (total of 5 days), min/day	703.7±58.1	716.4±55.7 **
PA[b] (week days), counts/min/day	510.2±167.5	434.6±124.4 **
PA[b] (weekend), counts/min/day	391.0±161.8	346.7±136.4 *
PA[b] (total of 5 days), counts/min/day	462.5±142.3	399.5±115.7 **
MVPA[a] (week days), min/day	91.3±36.9	76.2±29.3 **
MVPA[a] (weekend days), min/day	53.0±35.8	43.2±28.1 *
MVPA[a] (total of 5 days), min/day	75.9±31.3	62.9±26.1 **
Physical fitness:		
CRF, # completed laps	70.4±22.9	41.0±15.5 **

* p < .05; ** p < .01; [a] Adjusted for measured time; [b] Log-transformed values were used in the analysis; MT (measured time); WC (Waist Circumference); PA (Physical Activity); SB (minutes spent sedentary); MVPA (Moderate-to-Vigorous Physical Activity). SD (standard-deviation).

Table 2. Crude and adjusted relationship between WC and SB in rural school adolescents.

Model[a]	R²	Adjusted R²	Unstandardized coefficients Beta	Unstandardized coefficients St. error	95% CI for Beta Lower	95% CI for Beta Upper	Standardized Beta coefficient
						Waist Circumference	
1	10.1%	1.0%	0.01	0.05	-0.08	0.11	0.02
2	41.9%	17.5%	-0.03	0.04	-0.11	0.06	-0.04
3	59.1%	34.9%	0.03	0.05	-0.07	0.14	0.05
4	59.2%	35.1%	0.03	0.05	-0.08	0.14	0.05

[a] Model 1 = unadjusted; Model 2 = adjusted for chronological age, and sex; Model 3 = model 2 + adjusted for MVPA and CRF; Model 4 = model 3 + adjusted for parental education.

Conclusion

The present research revealed that both males and females failed to meet the current guideline of 60 continuous MVPA per day. Furthermore, WC was not independently associated with SB time in rural school adolescents. Future research is claimed among rural adolescents in different geographic contexts to try to clarify recent findings of less studied communities.
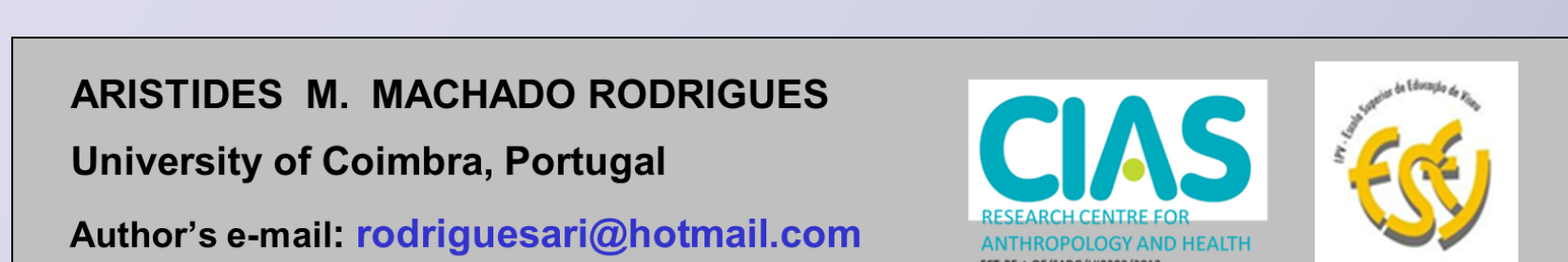
References

[1] Allender, S., et al. 2008. Journal Urban Health 85:938-51.

[2] Machado-Rodrigues AM, et al. (2014). Health Promotion International. Mar;29(1):118-29..

[3] Machado-Rodrigues AM, et al. (2016). Journal of School Health. 2016 Jan;86(1):54-60..

[4] Reyes, M.E., et al. (2003). Annals of Hum an Biology, 30:693-713..

ARISTIDES M. MACHADO RODRIGUES
University of Coimbra, Portugal
Author's e-mail: rodriguesari@hotmail.com

Keywords: *Waist Circumference, Moderate-to-Vigorous Physical Activity, Academic Performance, Inactivity*