SPORTS PARTICIPATION ASSOCIATED WITH HEALTH RISK BEHAVIORS IN ADOLESCENT ATHLETES

PRÁTICA ESPORTIVA ASSOCIADA AOS COMPORTAMENTOS DE RISCO À SAÚDE EM ATLETAS ADOLESCENTES

PRÁCTICA DEPORTIVA ASOCIADA A LAS CONDUCTAS DE RIESGO PARA LA SALUD EN ATLETAS ADOLESCENTES

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ABSTRACT

Introduction: Participation in structured sports activities is essential for the health of adolescents, since adolescence is a period in which several physical, psychological, cognitive and social changes occur, where the sense of autonomy in decision-making may prompt them to adhere to certain health risk behaviors. Objective: To verify the association of sports participation with health risk behaviors in adolescent athletes. Methods: A cross-sectional study with 367 athletes (15.68 ± 0.78 years) from Curitiba/PR (state of Paraná). Associated factors and health risk behaviors (HRB) were assessed using questionnaires. Poisson regression with robust variance was used to analyze factors associated with HRB, adopting p <0.05. Results: Team sport was positively associated with longer TV viewing time (PR: 3.11; 95% CI: 1.13-8.58). Years of participation were positively associated with longer TV viewing (PR: 1.14, 95% CI: 1.01-1.29) and video game playing time (PR: 1.12, 95% CI: 1.01-1.25). Negative associations were found for weekly training volume in longer video game playing time (OR: 0.92, 95% CI: 0.86-0.99), low vegetable consumption (PR: 0.98, 95% CI: 0.96-0.99), and in light (PR: 0.95, 95%CI: 0.92-0.99) and excessive (PR: 0.94, 95%CI: 0.89-0.99) alcoholic consumption. Conclusion: The weekly training volume favors a reduction in video game playing time, lower alcohol consumption, and increased vegetable consumption in adolescent athletes. ***Level of Evidence III; Diagnostic studies - Investigation of a diagnostic test; Study of non-consecutive patients, without a "gold standard" applied uniformly.***

Keywords: Sports; Health risk behaviors; Adolescents.

RESUMO

Introdução: A prática esportiva estruturada é essencial para a saúde dos adolescentes, visto que a adolescência é um período em que ocorrem diversas mudanças físicas, psicológicas, cognitivas e sociais, no qual a sensação de autonomia na tomada de decisões, pode levá-los a aderir a determinados comportamentos de risco para a saúde. Objetivos: Verificar a associação da prática esportiva aos comportamentos de risco para a saúde em atletas adolescentes. Métodos: Estudo transversal com 367 atletas (15,68 ± 0,78 anos) de Curitiba/PR. Os fatores associados e os comportamentos de risco para a saúde (CRS) foram avaliados através de questionários. A regressão de Poisson com variância robusta foi utilizada para analisar os fatores associados aos CRS, adotando p < 0,05. Resultados: O esporte coletivo foi associado positivamente ao maior tempo de TV (RP: 3,11; IC de 95%: 1,13-8,58). Os anos de prática foram associados positivamente ao maior tempo de TV (RP: 1,14; IC de 95%: 1,01-1,29) e videogame (RP: 1,12; IC de 95%: 1,01-1,25). As associações negativas foram encontradas para o volume de treino semanal no maior tempo de videogame (RP: 0,92; IC de 95%: 0,86-0,99), no baixo consumo de vegetais (RP: 0,98; IC de 95%: 0,96-0,99) e no consumo leve (RP: 0,95; IC de 95%: 0,92-0,99) e excessivo (RP: 0,94; IC95%: 0,89-0,99) de bebidas alcoólicas. Conclusão: O volume de treino semanal favorece redução de tempo de videogame, menos consumo de bebida alcoólica e aumento do consumo de vegetais em atletas adolescentes. ***Nível de Evidência III; Estudos diagnósticos - Investigação de um exame para diagnóstico; Estudo de pacientes não consecutivos, sem padrão de referência "ouro" aplicado uniformemente.***

Descritores: *Esportes; Comportamentos de risco à saúde; Adolescentes.*

RESUMEN

Introducción: La práctica deportiva estructurada es esencial para la salud de los adolescentes, ya que la adolescencia es un período en el que ocurren varios cambios físicos, psicológicos, cognitivos y sociales, en el que el sentimiento de autonomía en la toma de decisiones puede llevarlos a adherirse a ciertas conductas de riesgo para la salud. Objetivos: Verificar la asociación entre la práctica deportiva y las conductas de riesgo para la salud en atletas adolescentes. Métodos: Estudio transversal con 367 atletas (15,68 ± 0,78 años) de Curitiba/PR. Los factores asociados y las conductas de riesgo para la salud (CRS) se evaluaron a mediante cuestionarios. La regresión de Poisson con varianza robusta se utilizó para analizar los factores asociados a las CRS, adoptando p < 0,05. Resultados: El deporte de equipo se asoció positivamente con un mayor tiempo de televisión (CD: 3,11, IC del 95%: 1,13-8,58). Los años de práctica se asociaron positivamente con un mayor tiempo de televisión (CD: 1,14, IC del 95%: 1,01-1,29) y videojuegos (CD: 1,12, IC del

95%: 1,01-1,25). Se encontraron asociaciones negativas para el volumen de entrenamiento semanal en el tiempo de videojuegos más largo (*CD: 0,92; IC del 95%: 0,86-0,99), en el bajo consumo de vegetales (CD: 0,98; IC 95%: 0,96-0,99) y consumo leve (CD: 0,95; IC del 95%: 0,92-0,99) y excesivo (CD: 0,94, IC del 95%: 0,89-0,99) de bebidas alcohólicas. Conclusión: El volumen de entrenamiento semanal favorece una reducción en el tiempo de videojuegos, un menor consumo de bebidas alcohólicas y un mayor consumo de vegetales en atletas adolescentes.* ***Nivel de Evidencia III; Estudios de diagnóstico: investigación de una prueba de diagnóstico; Estudio de pacientes no consecutivos, sin un "estándar de oro" aplicado uniformemente.***

Descriptores: *Deportes; Conductas de riesgo para la salud; Adolescentes.*

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INTRODUCTION

Adolescence is a phase of intense physical and psychosocial changes, where adolescents acquire a sense of autonomy and independence in their attitudes, which can influence the adoption of behaviors considered beneficial or harmful to health.[1] Behaviors that are harmful to health include health risk behaviors (HRB), such as sedentary behavior, inappropriate eating habits, alcohol consumption, risky sexual behavior and situations of violence.[2,3]

Participation in physical activity (PA) can act as a catalyst for other positive health-related behaviors,[4,5] yet studies indicate that participation in sports activities can present positive and negative associations in relation to HRB in adolescent athletes.[6,7]

The literature indicates a high prevalence of low PA levels in adolescence.[8,9] In contrast, sports participation is an example of structured PA that is becoming more and more popular in this age group. Studies investigating PA, and especially sports participation, have increased in recent years, as have studies on HRB with the variable PA.[10,11] However, further investigation into these HRB associated with elements of sport in adolescent athletes is important, since investigations on these topics are nonexistent in the literature to date, and studies with the variable sports participation and HRB are scarce in the national literature, and presented succinctly in the international literature.[6,7] Therefore, this study aims to verify the association between sports participation and HRB in adolescent athletes.

MATERIALS AND METHODS

This is a cross-sectional, correlational study with intentional sampling, composed of male and female adolescents aged 15-17 years participating in individual and team sports, from sports clubs affiliated to their respective Paraná state federations, from the city of Curitiba/PR and metropolitan area.

An a priori sample size calculation was performed for hypothesis testing using version 3.1.9.2 of the GPower calculator. Considering a prevalence of appropriate eating habits and sports participation in 50% of the sample, an association of 1.72 and 2.08 for boys and girls, respectively,[12] with a significance level of 95% ($\alpha = 0.05$) and a power of 80% ($\beta = 0.20$), we reached an estimated number of 166 boys and 84 girls, totaling 250 subjects, with a 30% increase for potential losses and refusals, arriving at the final number of 325 subjects.

The study was conducted in accordance with the standards governing research involving human beings of the Brazilian National Board of Health (Resolution no. 466/2012), and was approved by the Institutional Review Board of Universidade Federal do Paraná under Certificate of Submission for Ethical Review registration number 78223317.5.0000.0102 on November 24, 2017, where the parties responsible signed the Informed Consent Form (ICF).

Data collection was carried out between March and May 2018 by a trained team from the Center for Physical Activity and Health Studies of Universidade Federal do Paraná. A pilot study was carried out in advance to provide assessors with training on the study procedures, aiming to improve data collection reliability.

A total of 416 adolescent athletes were assessed, but those who were ill (n = three) or preparing to return to activities (physical recovery) (n = five), and adolescents who failed to deliver the ICF signed by their parents or guardians, refused to participate in the study, completed the instruments incorrectly and/or incompletely, or were absent on the day of data collection, were excluded from the analyses and considered screening failures (n = 41). Therefore, the final sample size of the study was 367 adolescents.

To verify sex, age, and the variables related to sports participation, such as type of sport (individual or team), years of participation (how long the adolescent has been participating in the sport) and weekly training volume (days in the week x time of each training session) were obtained through questionnaires. To assess socioeconomic status (SES), we applied the Brazilian Economic Classification Criteria Questionnaire suggested by the Brazilian Association of Research Companies.[13] This questionnaire estimates the purchasing power of individuals and households, dividing the results into seven social classes: A1 (the highest), A2, B1, B2, C, D and E (the lowest).

To assess HRB, the adolescents answered the Youth Risk Behavior Survey, developed by the Center for Disease Control and Prevention (CDC),[14] which was translated and validated (Kappa mean agreement 68.6%) for Brazilian adolescents.[15] Table 1 shows the HRB classification of the adolescent athletes according to the CDC criteria.[14]

Statistical analysis

Data analysis was performed using version 24.0 of the SPSS statistical program. The Kolmogorov-Smirnov test was used to verify the normality of the continuous variables. The variables had nonparametric distribution, and were therefore presented in median and IQR in the descriptive table for continuous variables. The Mann-Whitney U test was used to compare the groups. Descriptive statistics (absolute and relative frequency) were used to verify the main HRB data, while the Chi-squared test was used to compare boys and girls. To verify the relationship between HRB and

Table 1. Assessment of health risk behaviors of adolescent athletes.

Sedentary behavior	Screen time equal to or greater than 2 hours (TV and video game), on a normal school day.
Eating habits	Consumption of fruit, or fruit juice, twice a day or less often, in the last 7 days prior to the survey. Consumption of vegetables twice a day or less often, in the last 7 days prior to the survey.
Alcohol consumption	Light: consumption of at least one dose of alcohol in the 30 days prior to the survey. Excessive: consumption greater than 5 doses of alcohol on at least one day in the 30 days prior to the survey.
Sexual behavior	Not having used a condom the last time they had sex.
Violent behavior	Involved in physical altercations in the last 12 months prior to the survey.

sports participation, we applied Poisson regression with robust variance to obtain the PR and 95% CI. All analyses were adjusted for the independent variables (sex, age, SES, type of sport, training time, and weekly training volume) adopting a significance level of p<0.05.

RESULTS

This study had a final sample size of 367 adolescent athletes, 262 boys and 105 girls, with a mean age of 15.68 ± 0.78. The sample was composed, in a greater proportion, of adolescents aged 15 years (51.8%) from social class A (50.7%) (Table 2).

Table 3 presents median and IQR values of the sports variables of the study participants. Regarding years of training, boys had a longer participation time than girls (5.00 (4.50) and 4.00 (2.75) (p = 0.01) for boys and girls respectively). However, for the weekly training volume, girls had a higher weekly volume than boys (10.00 (6.50) and 10.00 (7.00) (p = 0.02) for girls and boys respectively).

Table 4 presents the HRB of the adolescent athletes. When verifying sedentary behavior, 10.4% and 13.1% of the sample had long TV and video game screen times, respectively. Regarding consumption of fruit and vegetables, low consumption of these foods was reported in more than 66% of the sample assessed. In terms of alcohol consumption, 26.7% consumed at least one dose of alcohol and 15.3% consumed five or more doses of alcohol. In terms of sexual and violent behavior, it was verified that 6.3% did not use a condom the last time they had sex, and 12.5% had violent behavior. Moreover, sexual and violent behavior showed significant differences between sexes, where boys had a higher prevalence for risk in these behaviors (8.4% and 16.0% respectively), as compared to girls (1.0% and 3.8% respectively) (X^2=28.796 and 10.212) (p=0.01).

Tables 5 and 6 contain a description of the results of the gross and adjusted analyses of the association of sex, age, SES, and sports variables with the HRB of the adolescent athletes.

Table 5 presents the associations in the unadjusted model, where we noted negative associations between weekly training volume and long video game playing time (PR: 0.91; 95% CI: 0.86-0.97) and low fruit (PR: 0.98; 95% CI: 0.96-0.99) and vegetable (PR: 0.98; 95% CI: 0.96-0.99) consumption. Age was positively associated with light (PR: 1.54; 95% CI: 1.26-1.87) and excessive (PR: 1.81; 95% CI: 1.37-2.39) alcohol consumption. However, negative associations were identified for weekly training volume in light consumption (PR: 0.96; 95% CI: 0.93-0.99). For risky sexual behavior, females were negatively associated (PR: 0.11; 0.01-0.83), age positively associated (PR: 1.74; 95% CI: 1.13-2.68), and SES negatively associated (PR: 0.21; 95% CI: 0.06-0.72), as were years of training (PR: 0.55; 95% CI: 0.47-0.64) and weekly training volume (PR: 0.74; 95% CI: 0.69-0.78). Being female was negatively associated with violent behavior (PR: 0.23; 95% CI: 0.08-0.64).

However, after the adjustments, some associations remained similar to those of the unadjusted model, and other associations became significant (Table 6). Team sport (PR: 3.11; 95% CI: 1.13-8.58) and years of participation (PR: 1.14; 95% CI: 1.01-1.29) were positively associated with long TV viewing time. For long video game playing time, negative

Table 2. Sociodemographic variables of the research participants, Curitiba, Paraná, Brazil (n=367).

Variable	Total (n=367)		Boys (n=262)		Girls (n=105)		p
	n	%	N	%	N	%	
Age							
15 years	190	51.8	131	50.0	59	56.2	0.55
16 years	106	28.9	79	30.2	27	25.7	
17 years	71	19.3	52	19.8	19	18.1	
SES							
Class A	186	50.7	130	49.6	56	53.3	0.46
Class B	154	42.0	110	42.0	44	41.9	
Class C/D/E	27	7.3	22	8.4	5	4.8	

SES: Socioeconomic Status; Chi-square test for linear trend; p<0.05.

Table 3. Presentation of sports variables in medians and interquartile ranges of the research participants, Curitiba, Paraná, Brazil (n=367).

Variable	Total		Male		Female		p
	Median	IQR	Median	IQR	Median	IQR	
Years of participation	4.00	4.50	5.00	4.50	4.00	2.75	0.01
Weekly training volume	10.00	6.50	10.00	6.50	10.00	7.00	0.02

Weekly training volume: Hours per week (hours x days); Mann-Whitney U test; p<0.05.

Table 4. Description of the TV and video game screen time, consumption of fruit and vegetables, light and excessive alcohol consumption, risky sexual behavior and violent behavior of the research participants in absolute and relative frequencies, Curitiba, Paraná, Brazil (n=367).

Variable	Total		Boys		Girls		X^2	P
	N	%	n	%	n	%		
TV Viewing Time								
<2 hours of TV viewing time	329	89.6	223	88.9	96	91.4	0.504	0.47
≥2 hours of TV viewing time	38	10.4	29	11.1	9	8.6		
Video Game Playing Time								
<2 hours of video game playing time	319	86.9	224	85.5	95	90.5	1.635	0.20
≥2 hours of video game playing time	48	13.1	38	14.5	10	9.5		
Consumption of fruit								
Consumption of fruit or 100% fruit juice ≥2x per day in the last 7 days	123	33.5	81	30.9	42	40.0	2.776	0.09
Consumption of fruit or 100% fruit juice <2x per day in the last 7 days	244	66.5	181	69.1	63	60.0		
Consumption of vegetables								
Consumption of vegetables ≥2x per day in the last 7 days	116	31.6	84	32.1	32	30.5	0.087	0.76
Consumption of vegetables <2x per day in the last 7 days	251	68.4	178	67.9	73	69.5		
Light alcohol consumption								
Has not consumed alcohol in the last 30 days	269	73.3	195	74.4	74	70.5	0.598	0.43
Has consumed at least 1 dose in the last 30 days	98	26.7	67	25.6	31	29.5		
Excessive alcohol consumption								
Has not consumed at least 5 doses on a single occasion in the last 30 days	311	84.7	222	84.7	89	84.8	0.000	0.99
Has consumed at least 5 doses on a single occasion in the last 30 days	56	15.3	40	15.3	16	15.2		
Risky sexual behavior								
I have never had a sexual relationship*	219	59.6	134	51.1	85	81.0	28.796	0.01
Last time you had sex, you or your partner used a condom *	125	34.1	106	40.5	19	18.0		
Last time you had sex, you or your partner did not use a condom*	23	6.3	22	8.4	1	1.0		
Violent behavior								
Has not been involved in a physical altercation in the last 12 months	321	87.5	220	84.0	101	96.2	10.212	0.01
Has been involved in a physical altercation in the last 12 months	46	12.5	42	16.0	4	3.8		

X^2 Chi-square test for correlation of continuity and linear trend; *Groups with differences; p<0.05.

Table 5. Gross analysis of the association of sex, age, SES, type of sport, training time and weekly training volume with the health risk behaviors of the research participants, Curitiba, Paraná, Brazil (n=367).

	Long TV viewing time				Long video game playing time				Low fruit consumption				Low vegetable consumption		
Gross analysis	**OR**	**95%CI**	**P**		**OR**	**95%CI**	**p**		**OR**	**95%CI**	**p**		**OR**	**95%CI**	**p**
Sex															
Male	1	-	-		1	-	-		1	-	-		1	-	-
Female	0.77	0.38-1.57	0.48		0.65	0.34-1.26	0.21		0.86	0.72-1.03	0.86		1.02	0.87-1.19	0.76
Age	0.92	0.63-1.36	0.92		0.69	0.46-1.04	0.08		0.96	0.87-1.05	0.96		1.00	0.91-1.09	0.95
SES															
Class C/D/E	1	-	-		1	-	-		1	-	-		1	-	-
Class B	0.42	0.16-1.09	0.07		1.40	0.45-4.33	0.55		0.91	0.71-1.16	0.46		0.96	0.74-1.26	0.81
Class A	0.61	0.25-1.48	027		1.01	0.32-3.17	0.97		0.87	0.68-1.11	0.87		0.97	0.74-1.26	0.83
Type of sport															
Individual	1	-	-		1	-	-		1	-	-		1	-	-
Team	2.32	0.73-7.32	0.14		2.19	0.81-5.87	0.11		1.27	1.00-1.62	0.05		1.15	0.93-1.43	0.19
Sports variables															
Years of training	1.09	0.98-1.22	0.09		1.05	0.94-1.16	0.33		0.99	0.96-1.02	0.63		0.97	0.94-1.00	0.06
Weekly training volume	0.99	0.93-1.06	0.92		0.91	0.86-0.97	0.01		0.98	0.96-0.99	0.02		0.98	0.96-0.99	0.02

Weekly training volume: Hours per week (hours x days); SES: Socioeconomic status; Long TV viewing time: ≥2 hours of screen time; Long video game playing time: ≥2 hours of screen time; Low consumption of fruit or 100% fruit juice: <2x per day in the last 7 days; Low consumption of vegetables: <2x per day in the last 7 days; OR: Odds ratio; 95%CI: 95% confidence interval; p<0.05.

	Low alcohol consumption				Excessive alcohol consumption				Risky sexual behavior				Violent behavior		
Gross analysis	**OR**	**95%CI**	**P**		**OR**	**95%CI**	**p**		**OR**	**95%CI**	**p**		**OR**	**95%Ci**	**p**
Sex															
Male	1	-	-		1	-	-		1	-	-		1	-	-
Female	1.15	0.80-1.65	0.43		0.99	0.58-1.70	0.99		0.11	0.01-0.83	0.03		0.23	0.08-0.64	0.01
Age	1.54	1.26-1.87	0.01		1.81	1.37-2.39	0.01		1.74	1.13-2.68	0.01		1.30	0.93-1.84	0.12
SES															
Class C/D/E	1	-	-		1	-	-		1	-	-		1	-	-
Class B	0.89	0.47-1.70	0.74		1.05	0.39-2.79	0.91		0.57	0.20-1.61	0.29		0.65	0.23-1.83	0.42
Class A	0.88	0.47-1.66	0.71		1.01	0.38-2.67	0.97		0.21	0.06-0.72	0.01		0.98	0.37-2.58	0.96
Type of sport															
Individual	1	-	-		1	-	-		1	-	-		1	-	-
Team	1.10	0.68-1.77	0.68		1.04	0.53-2.01	0.90		0.94	0.33-2.68	0.91		1.63	0.67-3.96	0.27
Sports variables															
Years of training	1.01	0.95-1.08	0.56		1.08	0.99-1.18	0.05		0.55	0.47-0.64	0.01		1.09	0.98-1.21	0.09
Weekly training volume	0.96	0.93-0.99	0.02		0.95	0.91-1.00	0.05		0.74	0.69-0.78	0.01		1.01	0.96-1.05	0.61

Weekly training volume: Hours per week (hours x days); SES: Socioeconomic status; Light alcohol consumption: once a day in the last 30 days; Excessive alcohol consumption: 5 doses on a single occasion in the last 30 days; Risky sexual behavior: Did not use a condom last time they had sex; Violent behavior: Has been involved in a physical altercation in the last 12 months; OR: Odds ratio; 95%CI: 95% confidence interval; p<0.05.

associations were seen for age (PR: 0.59; 95% CI: 0.39-0.89) and weekly training volume (PR: 0.92; 95% CI: 0.86-0.99), with positive associations for years of participation (PR: 1.12; 95% CI: 1.01-1.25). For vegetable consumption, negative associations were seen for weekly training volume (PR: 0.98; 95% CI: 0.96-0.99). Age was positively associated with light (PR: 1.64; 95% CI: 1.32-2.03) and excessive (PR: 1.81; 95% CI: 1.37-2.39) alcohol consumption, yet negative associations were identified for weekly training volume, in light (PR: 0.95; 95% CI: 0.92-0.99) and excessive (PR: 0.94; 95% CI: 0.89-0.99) consumption. Being female (PR: 0.12; 0.01-0.90) and SES (PR: 0.28; 95% CI: 0.08-0.94) were negatively associated with risky sexual behavior. Being female was negatively associated with violent behavior (PR: 0.23; 95% CI: 0.08-0.62).

DISCUSSION

The purpose of this particular study was to verify the association between sports participation and HRB in adolescent athletes. The findings identified that sex, age, and SES had a positive or negative association with at least one evaluated HRB, as well as the sports variables.

The adjusted analyses indicated that adolescent team sports athletes are more likely to have long TV viewing time. The fact that the study involved a group of athletes may be one of the reasons for this greater likelihood of sedentary behavior, where the group of athletes can get together in front of the TV during training sessions and matches, for example, which is not the case in individual sports. Regarding years of training, the literature shows that elite athletes who have been training for years have higher levels of sedentary behavior than nonathletes,[16] which can serve to clarify that, as the length of participation in a given sport increases, sedentary time tends to be long.

However, the results of this study show that with advancing age and increasing weekly training volume, the long video game playing time of these athletes tends to decrease. In a systematic review, Bacil et al.[17] indicate that sedentary behavior tends to increase with advancing chronological age in adolescents, which contradicts our findings, where advancing age tends to reduce the duration of sedentary behavior. This difference may be due to the fact that our sample consisted of athletes, which makes them more committed to sport, reducing the time they are involved in these activities.

As the weekly training volume increases, the chances of athletes having low vegetable consumption decrease. The literature is consistent with the findings of this study, indicating that sports participation

Table 6. Adjusted analysis of the association of sex, age, SES, type of sport, training time and weekly training volume with the health risk behaviors of the research participants, Curitiba, Paraná, Brazil (n=367).

	Long TV viewing time			Long video game playing time			Low fruit consumption			Low vegetable consumption		
Adjusted analysis	**OR**	**95%CI**	**P**	**OR**	**95%CI**	**p**	**OR**	**95%CI**	**p**	**OR**	**95%Ci**	**p**
Sex												
Male	1	-	-	1	-	-	1	-	-	1	-	-
Female	0.84	0.40-1.79	0.66	0.80	0.41-1.57	0.53	0.88	0.74-1.05	0.17	1.02	0.87-1.19	0.74
Age	0.75	0.49-1.14	0.19	0.59	0.39-0.89	0.01	0.94	0.85-1.05	0.31	1.03	0.94-1.14	0.46
SES												
Class C/D/E	1	-	-	1	-	-	1	-	-	1	-	-
Class B	0.45	0.18-1.11	0.08	1.28	0.41-3.99	0.66	0.91	0.71-1.17	0.49	0.96	0.73-1.24	0.76
Class A	0.64	0.27-1.48	0.30	0.88	0.28-2.77	0.88	0.87	0.67-1.12	0.28	0.96	0.74-1.25	0.46
Type of sport												
Individual	1	-	-	1	-	-	1	-	-	1	-	-
Team	3.11	1.13-8.58	0.02	2.00	0.75-5.27	0.16	1.19	0.93-1.53	0.16	1.03	0.82-1.28	0.79
Sport variables												
Years of training	1.14	1.01-1.29	0.02	1.12	1.01-1.25	0.03	1.00	0.97-1.03	0.94	0.97	0.94-1.00	0.07
Weekly training volume	1.01	0.94-1.09	0.66	0.92	0.86-0.99	0.02	0.98	0.97-1.00	0.11	0.98	0.96-0.99	0.03

Weekly training volume: Hours per week (hours x days); SES: Socioeconomic status; Long TV viewing time: ≥2 hours of screen time; Long video game playing time: ≥2 hours of screen time; Low consumption of fruit or 100% fruit juice: <2x per day in the last 7 days; Low consumption of vegetables: <2x per day in the last 7 days; OR: Odds ratio; 95%CI: 95% confidence interval; p<0.05.

	Light alcohol consumption			Excessive alcohol consumption			Risky sexual behavior			Violent behavior		
Adjusted analysis	**OR**	**95%CI**	**p**	**OR**	**95%CI**	**p**	**OR**	**95%CI**	**p**	**OR**	**95%CI**	**p**
Sex												
Male	1	-	-	1	-	-	1	-	-	1	-	-
Female	1.22	0.85-1.75	0.26	1.12	0.66-1.92	0.66	0.12	0.01-0.90	0.03	0.23	0.08-0.62	0.01
Age	1.64	1.32-2.03	0.01	1.82	1.34-2.48	0.01	1.61	0.90-2.87	0.10	1.22	0.84-1.78	0.28
SES												
Class C/D/E	1	-	-	1	-	-	1	-	-	1	-	-
Class B	0.90	0.49-1.65	0.74	1.10	0.44-2.69	0.83	0.68	0.25-1.86	0.45	0.81	0.30-2.19	0.68
Class A	0.99	0.54-1.80	0.97	1.20	0.50-2.89	0.68	0.28	0.08-0.94	0.04	1.38	0.53-3.55	0.50
Type of sport												
Individual	1	-	-	1	-	-	1	-	-	1	-	-
Team	0.87	0.54-1.42	0.60	0.86	0.43-1.72	0.67	0.66	0.22-1.95	0.45	2.36	0.90-6.22	0.08
Sport variables												
Years of training	0.96	0.90-1.03	0.31	1.01	0.93-1.11	0.69	0.97	0.82-1.15	0.76	1.05	0.94-1.18	0.33
Weekly training volume	0.95	0.92-0.99	0.02	0.94	0.89-0.99	0.03	0.94	0.87-1.02	0.17	1.04	0.99-1.10	0.11

Weekly training volume: Hours per week (hours x days); SES: Socioeconomic status; Light alcohol consumption: 1 once a day in the last 30 days; Excessive alcohol consumption: 5 doses on a single occasion in the last 30 days; Risky sexual behavior: Did not use a condom last time they had sex; Violent behavior: Has been involved in a physical altercation in the last 12 months; OR: Odds ratio; 95%CI: 95% confidence interval; p<0.05.

is associated with healthy eating habits, where Dortch et al.[12] show a dose-response gradient between engagement in sports activities and adequate consumption of vegetables, indicating that this engagement was positively associated with adequate consumption of these foods. Accordingly, participation in sports can make it easier for athletes to be more disciplined in terms of keeping a healthy diet.[18]

This study also identified that as the age of the athletes increases, so do the chances of alcohol consumption. Age appears to be a predictor of alcohol consumption in adolescence, where older adolescents are more likely to consume alcohol.[19,20] PeNSE[21] points out that the indicator of alcohol consumption among adolescents aged 13 to 15 years increased by 56.6% when compared to adolescents aged 16 to 17 years (24.0% to 38.0%), and longitudinal studies point in the same direction, where the prevalence of alcohol consumption rose from 4.3%[19], 44.3%,[22] to 50% with advancing age.[23]

However, the more engaged they are with sports, the lower the chances of this consumption among adolescents. Nevertheless, the literature points towards results that contradict the findings of this study. Mays et al.[24] demonstrate that sport involvement was associated with an increase in alcohol consumption. In a systematic review, Kwan et al.[6] denote that 82% of the studies included had a positive association between sports participation and alcohol consumption.

Regarding risky sexual behavior, the literature indicates that female adolescents are less likely to report a risky sexual relationship than male adolescents,[1,25] results that contradict those of our investigation. This result can be explained by the fact that sport in adolescence is related to greater discipline among athletes, and because this research project involves an audience made up exclusively of athletes. With respect to this behavior, parents, due to a particularlity of Brazilian culture, tend to be more careful with girls than with boys.

In SES the results are in line with the literature, where Cruzeiro et al.[25] demonstrate that adolescents in classes D and E were 24% less likely (PR: 0.76; 95% CI: 0.61-0.95), to use some form of protection the last time they had sex than class A.

Finally, female adolescents were less likely to become involved in fights or to exhibit violent behavior than male athletes. The literature corroborates these results, where Lopes et al.[1] indicate that girls were 63% less likely to engage in violent behavior in the last year compared to boys. In addition, Farias Júnior et al.[26] showed that male adolescents had an odds ratio of 2.40 (95% CI: 2.06-2.79) of having been involved in some kind of fight in the last 12 months, as compared to female adolescents.

This study is not free of limitations, since the research was carried out using self-reported measures, which depend on the subjects' understanding of the variables being assessed. They can therefore overestimate and underestimate their responses, and to minimize this bias the questionnaires were applied with caution, always explained very carefully and monitored by the team trained in data collection. On the other hand, the analysis of sports variables with HRB in adolescent athletes is nonexistent in national literature, for which reason it was possible to verify the different outcomes in relation to HRB in this population, and the importance of sports participation in this population.

Further research is suggested to assess the sample of boys and girls separately, making this link between sports participation components and HRB in adolescent athletes, and investigating sport participation with sedentary behavior in adolescent athletes, since there is a lack of studies on this topic.

CONCLUSION

Being female was a protective factor for adolescents in comparison to being male in terms of violent and risky sexual behavior, and age favored a decrease in long video game playing times, but also favored an increase in alcohol consumption. Weekly training volume favors shorter video game playing times, lower alcohol consumption levels, and increased consumption of vegetables in adolescent athletes. However, longer sports participation time favored an increase in long TV and video game screen times.

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