

Association between Physical Education program in school and the practice team sports during university

Associação entre a participação na Educação Física escolar e a prática de esportes coletivos durante a universidade

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Abstract – The practice of team sports such as soccer and volleyball, are one of the main activities practiced by college. The objectives of the study were to compare the proportions of practice team sports in the years 2010, 2012 and 2014 in college and to analyze the association between participation in the classes of Physical Education, before entering university, with the practice team sports during the university period. Three cross-sectional surveys were conducted in the years 2010, 2012 and 2014, with students from a higher education institution. The dependent variable was the current practice of team sports and the independent variable the participation, prior to entering the university in Physical Education classes at school. Participated 1,084, 1,085 and 1,041 college in 2010, 2012 and 2014, respectively. The proportion of practicing team sports was stable in the three surveys and college who participated regularly of the lessons of Physical Education, prior to entering the university showed higher prevalence ratios (PR) practice of team sports during college years (2010, RP: 2.87; 95%CI: 1.48; 5.55; 2012, RP: 2.04; 95%CI: 1.14; 3.65; 2014, RP: 4.06; 95%CI: 1.58; 10.43). The number of students practicing team sports was similar in all investigated years and regular participation of college in Physical Education classes in school, period prior to entering university showed a positive association with practice of team sports at the university.

Key words: Cross-sectional studies; Leisure activities; Longitudinal studies; Physical education and training; Sports; Students.

Resumo – A prática de esportes coletivos, como futebol e voleibol, são uma das principais modalidades praticadas por universitários. Os objetivos do estudo foram comparar as proporções de prática de esportes coletivos entre os anos de 2010, 2012 e 2014 em universitários e analisar a associação entre a participação nas aulas de Educação Física escolar, antes do ingresso na universidade, com a prática de esportes coletivos durante o período universitário. Foram realizados três inquéritos transversais, nos anos de 2010, 2012 e 2014, com universitários de uma instituição de ensino superior. A variável dependente foi a prática atual de esportes coletivos e a variável independente a participação, antes da entrada na universidade, nas aulas de Educação Física na escola. Participaram 1.084, 1.085 e 1.041 universitários em 2010, 2012 e 2014, respectivamente. A proporção de prática de esportes coletivos foi estável nos três inquéritos e os universitários que participaram de forma regular das aulas de Educação Física escolar, antes da entrada na universidade, apresentaram maiores razões de prevalências (RP) de prática de esportes coletivos durante a fase universitária (2010, RP: 2,87; IC95%: 1,48 – 5,55; 2012, RP: 2,04; IC95%: 1,14 – 3,65; 2014, RP: 4,06; IC95%: 1,58 – 10,43). A quantidade de universitários praticantes de esportes coletivos foi semelhante em todos os anos investigados e a participação regular dos universitários nas aulas de Educação Física na escola, em período anterior ao ingresso na universidade, demonstrou associação positiva com a prática esportiva, em modalidades coletivas durante a universidade.

Palavras-chave: Atividades de lazer; Educação física e treinamento; Esportes; Estudantes; Estudos longitudinais; Estudos transversais.

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INTRODUCTION

Regular physical activity (PA) and the intensity of these activities in youth can contribute to reducing the prevalence of diseases harmful to health in the short and medium term and also in adulthood¹ such as osteoporosis² and obesity³. Systematic review studies have shown that the predictor effect of PA performed at younger ages with practice in adulthood is low to moderate^{1,4}.

Some studies have shown associations between leisure-time PA, including sports in adolescence and the practice of PA globally or just during leisure time in adulthood^{1,4-6}. The practice of sports during adolescence, such as soccer, was associated with the practice of the same sports in adulthood⁵. Involvement in sports, physical exercises or games during leisure time in adolescence can also contribute to the global PA practice in adulthood at levels recommended for health⁷.

Although the limited amount of publications with information on the effect of Physical Education classes in school (EFE) in adolescence on the practice of PA in adulthood in Brazilian subjects in international studies^{6,8}, it is noteworthy that the association between participation the EFE classes with PA practice in adulthood is indirectly related to EFE perceptions, because when interesting, pleasant and encouraging of PA, these classes favored the practice of PA in adulthood⁶, and if there were more negative learning perception in EFE, it represented a predictor of low levels of PA in adulthood⁸. Regarding the participation in EFE, the decline in the PA intensity of EFE classes over the years was evidenced in a review study⁹.

With decreasing intensity of EFE classes⁹ associated with high prevalence of physical inactivity in adolescence in different regions of Brazil¹⁰, the likelihood of maintaining this physical inactivity behavior globally or during leisure time may be higher, as observed in the high prevalence of physical inactivity among Brazilian university students through a systematic review¹¹. The university period is a time of oscillations of habits, increased susceptibility to risk behaviors^{12,13} and abandonment of PA practices¹⁴ such as sports, which are one of the main forms of PA among adults^{15,16}.

A study analyzed in students from a public institution in the state of Bahia, Brazil, the association between participation in EFE before entering the university and physical inactivity during university, and no association was observed¹⁷. Given the scarcity of information on this topic and the relevance of EFE and team sports to achieve the levels of PA recommended for health¹⁸, monitoring is essential. Therefore, the aims of this study conducted with students were to compare the proportions of the practice of team sports in the years 2010, 2012 and 2014 and to analyze the association between participation in Physical Education classes before entering university with the practice of team sports during the university period.

METHODOLOGICAL PROCEDURES

This study is derived from the MONISA survey (Monitoring of Health

and Quality of Life Indicators of University Students) held in a university in the state of Bahia in the years 2010, 2012 and 2014. The methods used in this study have been previously described¹⁹.

The population consisted of students enrolled in the second semester of undergraduate courses and distance teaching students, those with special registration and college freshmen entering university in the second half were excluded. For the sample size calculation²⁰, the same parameters were considered in the three surveys: target population (2010: 5,461; 2012: 5,767; 2014: 5,224), confidence level of 95% prevalence of 50%, sample error of 3 p.p and addition of 20% for possible losses and refusals and 15% for the confusion control, making the following samples: 2010: 1,232; 2012: 1,243; and 2014: 1,223.

The sample was stratified considering the proportionality of courses, 30 in 2010, 34 in 2012 (inclusion of four new courses) and 33 in 2014 (Association of courses of Language and Arts with qualification in Spanish and Language and Arts with qualification in English), study period (day and night) and years of entering university (2010 survey: 2010, 2009, 2008 and 2007 and earlier, 2012 survey: 2012, 2011, 2010 and 2009 and earlier, and 2014 survey: 2014, 2013, 2012 and 2011 and earlier).

University students randomly selected in each stratum through the registration list in alphabetical order were sought within three attempts on different days and times, and if not found or refused to participate, there was replacement. Data collections were carried out in the months from September to November in the premises of the university, with the help of a team previously trained in July and August. The information was obtained via Isaq-A questionnaire (Health and Quality of Life Indicators of University Students)²¹.

The dependent variable of this study was the practice of team sports held during leisure time of university students. The question used measured the practice in a normal week and presented 17 options of leisure-time physical activity and participants should mark the sport practiced, how many days and time per day of practice. The team sports options were: soccer, handball, volleyball and basketball. These practices were categorized into *yes*, referring to the practice of 1 or more team sports at least once a week, regardless of time and *no*, referring to students who reported not to perform any of these procedures and who did not practice other leisure-time physical activities.

The independent variable of this study was the participation in EFE. It was requested from participants the answer in years of participation in EFE classes in the final grades of elementary school (5th to 8th grade) and high school (1st to 3rd grades). The total sum in years in these grades is seven years (except participants who failed at some point and that repeated one or more years). Thus, these two variables were categorized as *never or rarely participated* (referring to have not participated in EFE classes in elementary and high school); *irregular participation* (participation of one to six years in any of the grades); *regular participation* (participation in classes every year, in seven or more years).

The other explanatory and control variables for confounding factors

and their specifications in relation to common and different categories among surveys are presented in Box 1.

Box 1. Description of exploratory variables

<p>Variables with the same categories in 2010, 2012 and 2014 survey: Sex: male and female; Marital status: with and without partner; Link with the university Study period: night and day; Leisure-time PA during college years (categorized as yes and no) General gymnastics, outdoor running, aerobic exercises, cycling, wrestling or martial arts, tennis, treadmill running, treadmill walking, water exercises, surfing, swimming, weightlifting and outdoor walking.</p>
<p>Variables with specific categories for the 2010 survey: Socio-demographic variable. Age group into thirds: 1st tertile, 17-20 years; 2nd tertile, 21-23 years; and 3rd tertile, 24-52 years; Link with the university. Years of exposure to the university: 1st year university entrance in 2010; 2nd year university entrance in 2009; 3rd year university entrance in 2008; and 4th year and more, university entrance in 2007 and earlier.</p>
<p>Variables with specific categories for the 2012 survey: Socio-demographic variable. Age group into thirds: 1st tertile, 17-20 years; 2nd tertile, 21-23 years; and 3rd tertile, 24-54 years; Link with the university. Years of exposure to the university: 1st year university entrance in 2012; 2nd year university entrance in 2011; 3rd year university entrance in 2010; and 4th year and more, university entrance in 2009 and earlier;</p>
<p>Variables with specific categories for the 2014 survey: Socio-demographic variable. Age group into thirds: 1st tertile, 17-20 years; 2nd tertile, 21-23 years; and 3rd tertile, 24-57 years; Link with the university. Years of exposure to the university: 1st year university entrance in 2014; 2nd year university entrance in 2013; 3rd year university entrance in 2012; and 4th year and more, university entrance in 2011 and earlier.</p>

Data tabulation was performed in the EpiData software version 3.1 and analysis in SPSS software version 15.0. The description of information was carried out by descriptive statistics (absolute and relative frequencies, mean, standard deviation, minimum and maximum). The chi-square test for linear trend was used to compare the proportions of practice of team sports during the years of investigations. To identify the variables that would be used as confounding variables (sociodemographic, link with the university and leisure-time PA) in the analysis of participation in EFE with practice of team sports in each survey, the chi-square and chi-square tests for linear trend were used.

The analysis of the association between participation in EFE with the practice of team sports for each survey was conducted through prevalence ratios (PR) in the crude and adjusted analyses through the Poisson regression with adjustment for the robust variance. In the adjusted analysis, the sociodemographic variables, link with the university and leisure-time PA with p-value of the chi-square and chi-square test for linear trend <0.20, the association with the practice of team sports were used as confounding variables. The confounding variables were included in the adjustment simultaneously and remained in the final adjustment variables with p-value of the Wald test <0.20, by the backward variable selection procedure. The significance level was 5%.

RESULTS

Overall, 1,084, 1,085 and 1,041 students participated in the 2010, 2012 and 2014 surveys, respectively. The average age in 2010 was 23.6 years (± 5.2 ; 17-52 years) in 2012, 24 years (± 6 ; 17-54 years) and in 2014, 23.7 years (± 5.8 ; 17-57 years). The sample characteristics are presented in Table 1. The proportion of students who reported never or rarely having participated in EFE was 11.3% in 2010 and slightly more than 9% in the other two surveys (Table 1). Regular participation in EFE increased from 34% in 2010 to 44.5% in 2014.

Table 1. Sample characteristics according to sociodemographic variables, link with the university, positive affirmation of leisure-time PA and participation in EFE classes before entering university

Variables	2010		2012		2014	
	n	%	n	%	n	%
Sex						
Male	491	45,3	489	45,1	494	47,5
Female	592	54,7	595	54,9	547	52,5
Age group						
1 st tertile	285	26,7	304	28,3	322	31,2
2 nd tertile	400	37,4	358	33,3	352	34,1
3 rd tertile	384	35,9	412	38,4	357	34,6
Marital status						
Without partner	937	86,4	921	85,3	905	87,4
With partner	147	13,6	159	14,7	131	12,6
Study period						
Day	735	67,8	731	67,4	747	71,8
Night	349	32,2	354	32,6	294	28,2
Year of entrance						
1 st year	233	21,5	230	21,0	200	19,2
2 nd year	267	24,6	263	24,2	199	19,1
3 rd year	225	20,8	216	19,9	227	21,8
4 th year and more	359	33,1	376	34,7	415	39,9
Physical activity before entering university						
Gymnastics in general	1.060	3,7	1.072	1,9	1.029	1,4
Outdoor running	1.060	6,9	1.072	8,8	1.029	11,0
Aerobic exercises	1.060	4,2	1.072	5,5	1.029	4,0
Cycling	1.060	4,9	1.072	4,1	1.029	5,2
Fights or martial arts	1.060	4,2	1.072	4,5	1.029	7,6
Tennis	1.060	0,5	1.072	0,7	1.029	0,5
Treadmill running	1.060	4,2	1.072	6,0	1.029	6,5
Treadmill walking	1.060	2,9	1.072	3,8	1.029	4,1
Water gymnastics	1.060	0,4	1.072	0,6	1.029	0,3
Surfing	1.060	2,2	1.072	1,3	1.029	1,9
Swimming	1.060	2,6	1.072	2,0	1.029	1,7
Bodybuilding	1.060	20,9	1.072	24,3	1.029	23,4
Outdoor walking	1.059	7,2	1.072	8,1	1.029	8,6
Physical education at school						
Never or rarely participated	120	11,3	96	9,2	99	9,7
Irregular participation	578	54,3	527	50,4	468	45,8
Regular participation	366	34,4	423	40,4	454	44,5

%. Proportion.

The proportions of practice of team sports during the university period remained similar among surveys (Figure 1). The proportions of practice of team sports during the university period according to the explanatory variables in each year of the survey are presented in Table 2. In all three surveys, men reported practicing more team sports than women and there were more practitioners of team sports among practitioners of wrestling or martial arts.

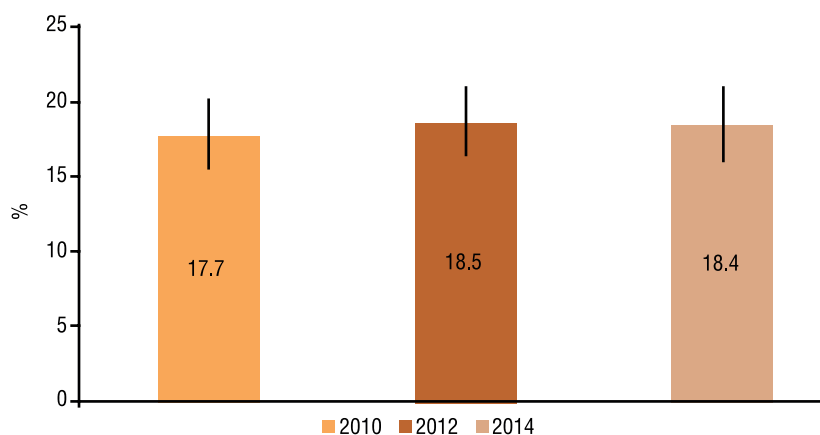


Figure 1. Proportion of practice of team sports for each survey.

Table 2. Proportion of practice of team sports during the university period according to explanatory variables stratified for the years of survey.

Variables	2010			2012			2014		
	n	%	p	n	%	p	n	%	p
Sex			<0,01*			<0,01*			<0,01*
Male	481	36,2		481	37,4		487	36,3	
Female	578	2,4		590	3,1		542	2,2	
Age group			0,13**			0,61**			0,64**
1 st tertile	279	20,1		303	18,5		318	17,3	
2 nd tertile	394	18,8		357	20,2		350	19,1	
3 rd tertile	372	15,6		401	17,2		352	18,8	
Marital status			0,81*			0,66*			0,94*
Without partner	919	17,8		911	18,8		895	18,3	
With partner	141	17,0		156	17,3		129	18,6	
Study period			0,15*			0,75*			0,12*
Day	718	16,6		725	18,2		739	17,2	
Night	342	20,2		347	19,0		290	21,4	
Year of entrance			0,05**			0,43**			0,32**
1 st year	228	23,2		228	19,3		198	20,2	
2 nd year	258	17,8		262	21,0		197	13,7	
3 rd year	223	13,5		213	15,0		222	15,3	
4 th year or more	351	16,8		369	18,2		412	21,4	
Gymnastics in general			0,70*			0,32*			0,28*
No	1.021	17,8		1.052	18,6		1.015	18,5	
Yes	39	15,4		20	10,0		14	7,1	
Outdoor running			<0,01*			0,20*			<0,01*
No	987	16,2		978	18,0		916	17,1	
Yes	73	38,4		94	23,4		113	28,3	

Continue...

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Variables	2010			2012			2014		
	n	%	p	n	%	p	n	%	p
Aerobic exercises			0,23*			0,04*			0,15*
No	1.015	18,0		1.013	19,1		988	18,7	
Yes	45	11,1		59	8,5		41	9,8	
Cycling			0,30*			0,46*			0,41*
No	1.008	17,5		1.028	18,3		976	18,1	
Yes	52	23,1		44	22,7		53	22,6	
Wrestling or martial arts			<0,01*			<0,01*			<0,01*
No	1.015	17,0		1.024	17,5		951	17,1	
Yes	45	33,3		48	39,6		78	33,3	
Tennis			0,89*			0,10*			0,02*
No	1.055	17,7		1.065	18,3		1.024	18,2	
Yes	5	20,0		7	42,9		5	60,0	
Treadmill running			0,20*			0,47*			0,08*
No	1.016	17,4		1.008	18,3		962	18,9	
Yes	44	25,0		64	21,9		67	10,4	
Treadmill walking			0,23*			0,52*			0,77*
No	1.029	18,0		1.031	18,6		987	18,4	
Yes	31	9,7		41	14,6		42	16,7	
Water exercises			0,35*			0,24*			0,41*
No	1.056	17,8		1.066	18,6		1.026	18,4	
Yes	4	-		6	-		3	-	
Surfing			<0,01*			0,09*			0,44*
No	1.037	17,2		1.058	18,2		1.009	18,2	
Yes	23	43,5		14	35,7		20	25,0	
Swimming			0,13*			0,23*			<0,01*
No	1.032	17,4		1.051	18,3		1.011	17,8	
Yes	28	28,6		21	28,6		18	50,0	
Weightlifting			0,02*			<0,01*			0,10*
No	838	16,3		811	16,2		788	17,3	
Yes	222	23,0		261	25,7		241	22,0	
Outdoor walking			0,17*			0,76*			0,96*
No	983	18,1		985	18,6		941	18,4	
Yes	76	11,8		87	17,2		88	18,2	

%; Proportion; * Chi-square test; ** Chi-square test for linear trend.

The results of the association between participation in EFE and practice of team sports are shown in Table 3. In the crude analysis, students who reported regular participation in EFE had higher prevalence of practice of team sports during college. These associations remained in the adjusted analyses (Table 3). The prevalence of practice of team sports was 2.9 times higher (PR: 2.87; CI 95%: 1.48; 5.55) in 2010 and approximately four times higher in the 2014 survey for students who reported regular participation in EFE.

Table 3. Association between participation in EFE and practice of team sports.

Variable			Crude analysis		Adjusted analysis	
	n	%	PR (CI95%)	p	PR (CI95%)	p
2010 Survey						
Physical Education in school				<0,01		<0,01
Never or rarely participated	114	7,0	1,00		1,00*	
Irregular participation	566	14,0	1,99 (0,99 – 4,00)		1,79 (0,92 – 3,51)	
Regular participation	361	26,9	3,83 (1,92 – 7,63)		2,87 (1,48 – 5,55)	
2012 Survey						
Physical Education in school				<0,01		<0,01
Never or rarely participated	94	10,6	1,00		1,00**	
Irregular participation	520	14,6	1,37 (0,74 – 2,56)		1,21 (0,67 – 2,20)	
Regular participation	419	26,3	2,47 (1,34 – 4,53)		2,04 (1,14 – 3,65)	
2014 Survey						
Physical Education in school				<0,01		<0,01
Never or rarely participated	98	4,1	1,00		1,00***	
Irregular participation	461	14,8	3,61 (1,35 – 9,67)		2,94 (1,13 – 7,63)	
Regular participation	113	25,1	6,15 (2,33 – 16,28)		4,06 (1,58 – 10,43)	

%: Proportion; PR: Prevalence Ratio; CI 95%: 95% Confidence Interval; * Adjusted at the end for sex, years of exposure to university, outdoor running and wrestling ** Adjusted at the end for sex, wrestling or martial arts and weightlifting *** Adjusted at the end for sex, outdoor running, wrestling or martial arts, tennis and swimming.

DISCUSSION

In this study, the results showed that in the three surveys, regular participation in EFE classes prior to entering university was associated with higher prevalence of practice of team sports during university years. The proportion of practice of team sports was similar among surveys.

The prevalence of students who reported regular participation in EFE increased from 34% to 45% among surveys. In a cross sectional study with Physical Education undergraduate students of a higher education institution in the state of Bahia, Brazil, 92.3% of students said that before entering the university, they regularly attended EFE classes¹⁷. The differences between the results of this study and the study by Sousa et al.¹⁷, may be related to the sample, because this study included students from different courses and physical education undergraduate students showed profile of involvement with leisure-time physical activity. In addition, it is noteworthy that the measure used in this study to assess participation in EFE classes did not estimate the intensity of activities, therefore, EFE classes may have been composed of mild and sedentary physical efforts²², but perceived as class participation. However, increased participation in EFE classes can contribute to the maintenance of PA levels during school and to avoid health risks in adulthood, such as obesity³.

In this study, college students who reported regular participation in EFE classes showed greater involvement with the practice of team sports, regardless of other factors such as practice of different leisure-time physical activities. Divergent results were observed in undergraduate Physical Education students from a public university in the state of Bahia, Brazil,

in which no association was found between participation in EFE before entering the university and physical inactivity during the university period¹⁷. In contrast, these results were similar to a study conducted with Canadian adults, which showed higher practice of physical exercise in adulthood in the group that participated in EFE classes for six sessions per week in elementary school²³. EFE programs may favor maintenance of PA levels during childhood and adolescence, both during school²⁴, as out of school²⁵, and promote the adoption of the practice of team sports in other stages of life.

During the university period, the proportion of undergraduate students who reported practicing team sports remained stable among surveys. Interestingly, in cross-sectional study with university students of Romania, the proportion of soccer practitioners (18.97%)²⁶ was similar to values recorded in surveys of this study. In addition, women in this study had lower prevalence of practice of team sports, which corroborates the results of the study with adults in São Paulo, SP, which revealed that women had smaller proportions of practice of leisure-time physical activities¹⁵. Undergraduate female Physical Education students of a state institution of Bahia, Brazil also showed similar characteristics (higher prevalence of leisure-time physical inactivity)¹⁷. In a study with adolescents from Aracaju, SE, Brazil, girls also had lower prevalence of practice of soccer than boys²⁷. The need for encouragement for the practice of team sports, especially in women, may contribute to greater energy expenditure, specifically due to the high metabolic requirements of these activities²⁸, which range from moderate to intense efforts.

Interestingly, college students of this study who practiced wrestling or martial arts, outdoor running and weightlifting had higher prevalence of practice of team sports. These associations may have occurred due to the benefits for physical fitness²⁹. Aerobic modalities favor team sports because higher cardiorespiratory capacity may contribute to the reduction of fatigue²⁹.

Despite limitations from the study design due to the lack of causality and lack of information on EFE contents given that this discipline covers topics related to procedural issues of sports and also other contents of conceptual and attitudinal aspects³⁰, this study showed the association between EFE and practice of team sports in adulthood in three surveys. It is believed that the possible memory bias of the question referring to EFE participation was minimized due to the satisfactory level of reproducibility of measurements²¹.

CONCLUSION

Regular participation in EFE was associated with the practice of team sports during college in three surveys, and there was a stabilization of proportions of the practice of team sports among surveys. In all three surveys, men and practitioners of wrestling or martial arts were more involved in team sports.

The results of this study showed, in three surveys, that participation in EFE classes, from the final grades of elementary school may favor the

continued practice of team sports during the university period. Further studies should be aimed at investigating the types of activities carried out on EFE classes and their association with the practice of team sports and physical activity levels in adulthood.

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