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Nivel de actividad física habitual en escolares de 13 años de España e India. Un estudio transcultural

Level of habitual physical activity among 13-year-old adolescents from Spain and India. A cross-cultural study

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Resumen: El nivel de actividad física de las personas es muy importante a nivel internacional. El objetivo de este estudio fue analizar el nivel de actividad física habitual de escolares de India y España. Para lograr este objetivo, se utilizó el cuestionario PACE (Physician-based Assessment and Counseling for Exercise). Este cuestionario valora con dos preguntas cuántos días en la última semana (PACE 1) y en una semana habitual (PACE 2) el sujeto realiza al menos 60 minutos de actividad física. La muestra del estudio estuvo compuesta por 154 adolescentes de 13 años de edad. Del total de la muestra, 61 adolescentes (36 hombres, 59%, y 25 mujeres, 41%) eran de Nagaon, Assam (India), y 93 adolescentes (39 hombres, 42%, y 54 mujeres, 58%) eran de la Región de Murcia (España). Los resultados mostraron que los adolescentes de 13 años de España e India no realizan suficiente actividad física, según las recomendaciones de la OMS. El 80.5% de los adolescentes españoles y el 76% de los adolescentes indios de la muestra fueron inactivos, según la clasificación del cuestionario PACE. Por tanto, se sugiere llevar a cabo programas de intervención para aumentar el nivel de actividad física en ambos países.
Palabras clave: Deporte, Salud, Escolares, Estilo de vida.

Abstract: The level of physical activity of people is a very important issue internationally. The aim of this study was to analyze the level of habitual physical activity among adolescents from India and Spain. To achieve this purpose, the questionnaire Physician-based Assessment and Counseling for Exercise (PACE) was used. This questionnaire assesses with two questions how many days in the last week (PACE 1) and in a usual week (PACE 2) the subject does at least 60 min of physical activity. The study sample consisted of 154 13-year-old adolescents. Out of total sample, 61 adolescents (36 males, 59 %, and 25 females, 41%) were from Nagaon, Assam (India), and 93 adolescents (39 males, 42%, and 54 females, 58%) from the Region of Murcia (Spain). The results showed that the 13-year-old adolescents from Spain and India do not do enough physical activity, according to the recommendations of the WHO. The 80.5% of the Spanish adolescents and the 76% of the Indian adolescents of the sample were inactive considering the classification of PACE questionnaire. Therefore, intervention programs to increase the level of physical activity are suggested for both countries.
Keywords: Sport, Health, School children, Lifestyle.

Introduction

If exercise could be packed in a pill, it would be the single most widely prescribed and beneficial medicine in the nation (narrated by *Robert N. Butler, M.D. Former Director National Institute on Aging*). Obesity and overweight have become a global epidemic. The World Health Organization (WHO) highlighted obesity as major global health problem and recognized that physical activity levels worldwide were falling as a result of industrialization, urbanization and economic development (Caballero, 2007). A growing number of organizations are producing position statements and policy documents on health-related behaviors, including physical activity. This reflects the increasing concern regarding the changes in morbidity and premature mortality that face many contemporary societies. However, due to imbalances in physical activity and its associated detrimental consequences, nowadays, society understands that physical exercise and sport have a very important role in the preservation and development of health in humans and beneficial contributions of physical activity and sport, performed under certain parameters of frequency, intensity and duration, are universally known.

Surprisingly, the higher rate of socio-cultural development, the worse living conditions: poor quality diet, sedentary lifestyle, acquisition of habits harmful to health, among others (Perula-de-Torres et al. 1998). For this reason, physical activity is related to a healthy lifestyle (Vílchez-Barroso 2007). Habitual Physical Activity (PA) has been associated with a number of potential positive outcomes. Although frequency of past PA behaviors has been commonly used to indicate habitual PA, several researchers have contended that frequency estimates are insufficient to explain habit. Theory and research converge in pointing to the importance of structured out-of-school-time (OST) activities as important assets in the positive development of youth (Mahoney et al. 2005). Sports participation, the most ubiquitous OST activity (Larson and Verma 1999), has been associated with such positive indicators of development as higher academic performance in high school, greater likelihood of attending college, and greater autonomy and satisfaction (Barber et al. 2001).

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Physical activity can produce benefits in different health parameters of children and adolescents, like physical self-concept, muscular strength, aerobic endurance and cholesterol (Borrego et al 2012, 2014, 2015a,b,c; Fraguela, Varela & Sanz, 2016), body composition, heart rate variability and blood pressure (López et al 2013, 2015c,d, 2016e,f). Physical activity is also very beneficial in people with special needs, such as individuals with Down syndrome (López & **López**, 2013) and school children with ADHD (López et al 2014, 2015a,b,e,f,g, 2016a,c), and can improve health parameters such as physical fitness, body image, heart rate, blood pressure, body fat, general and segmentary motor coordination, sleep quality and life quality.

In 2004, WHO endorsed a global strategy on diet, physical activity and health indicating that inactivity is not just a problem for developed countries but equally for developing and underdeveloped countries (World Health Organization 2004). However, the positive effects of the practice of physical activity and sport do not correspond to the frequency of the practice by the schoolchildren. Therefore, promoting physical activity and sports has become one of the most important goals of schools in most of the developed countries, due to the large number of sedentary lifestyle among people. In terms of physical activity and exercise, strong habit appears to be associated with the following processes: (a) the urge to exercise when exposed to physical activity cues, (b) minimal conscious efforts for initiation and execution, (c) feeling of guilt when exercise is not performed, and (d) planned and routinized exercise involvement (Grove and Zillich, 2003). Based on this consideration, Grove and Zillich (2003) developed a measure of exercise habit strength. Given the fact that Physical Education (PE) enjoyment seems to influence PA, it would also be desirable to examine how it influences exercise habit strength. The estimates of activity levels of the population will partly be dependent on the method used. Similarly, the criteria defining the quantification of 'activity' will likely be inversely related to the activity levels reported. In this regard, some researches indicate a significant decrease in the practice of physical activity and sport from childhood to adolescence (Perula-de-Torres et al, 1998; Román et al, 2006).

In India, unfortunately, in this present era of the 21st century when countries are thinking for sports globalization, Indian professionals are still striving for making PE a compulsory subject in schools, across Central Government and State Government. To a large extent, government has been responsible for this decline because it is the government from where the policies are passed onto the masses. Except counting few exceptional sports, Indian condition in many other sports is questionable. There are various loopholes and drawbacks in PE which directly and indirectly decrease the level of motivation in people to participate in physical activities and sports. Indian schooling (primary to higher secondary level) systems are run by different Educational Boards such as CBSE, ICSE, CB, State Boards etc. Though these Boards has a subject called Physical Education in their syllabus, it is often a neglected part of education and many schools across the country do not realize the importance of having PE as a part of the system. Positively, they do sometimes conduct various tournaments for games and sports but when asked whether PE or any physical activity is compulsory for all the students in their institute, the reply is often negative. It is widely recognized that PE at school level forms the foundation of an overall development of a student's mind and body. According to the School Health and Fitness Survey conducted by EduSports (a school sports and PE company), 40 % of children in India don't have healthy Body Mass Index. The survey was conducted during the academic year 2013-2014 and covered 115559 students in the age group between 7 to 17 years in 287 schools across 85 cities in India. Further, it revealed that the score of "non-metros" was better than "metros" in terms of BMI levels and fitness parameters. According to the survey, "the current generation of school children in India, regardless of age group or gender, look to be heading towards an unhealthy future with health and fitness levels lagging".

In Spain, the latest studies on habitual PA in Spanish school children show that more than 65 % of school children in Spain do physical activity (Castells et al. 2006; Hernández et al. 2007; Romero et al. 2008; Vera-Lacárcel 2006). However it is also clear that the PA they do is not enough, according to WHO recommendations, as it has been indicated in the studies by Romero et al. (2008), Martínez-Gómez et al. (2009) and López et al. (2016b,d). Therefore, according to recent studies, Spanish schoolchildren do PA, but not enough.

This situation has provoked that the promotion of healthy habits and lifestyles is now a priority in developed as well as in underdeveloped societies. According to WHO, in order to improve cardio-respiratory and muscular fitness, bone health, and cardiovascular and metabolic health biomarkers: (1) children and youth aged 5–17 should accumulate at least 60 min of moderate- to vigorous-intensity physical activity daily. (2) Amounts of physical activity greater than 60 min provide additional health benefits. (3) Most of the daily physical activity should be aerobic.

The purpose of this study was to analyze the level of habitual physical activity among adolescents from the Region of Nagaon, Assam (India-Asia) and Murcia (Spain-Europe), by region and gender, paying particular attention to the percentage of active and inactive school children. Based on the above literature review, it was hypothesized that, H_o1: There would be significant difference on the level of habitual PA between the adolescents from India and Spain, and Spain would have higher habitual physical activity mean level in comparison to India. It was also hypothesized that, H_o2: there would be significant difference on the habitual PA mean level between

male and female adolescents and male adolescents would have higher mean level than their counterparts.

Methods

Participants

The study sample consisted of 154 13-year-old adolescents. All the adolescents belonged to High School level (adolescent stage). Out of total sample, 61 students (36 males, 59 %, and 25 females, 41%) were from Nagaon, Assam (India), and 93 adolescent students (39 males, 42%, and 54 females, 58%) from the Region of Murcia (Spain). Combined, by sex, the schoolchildren of the total sample were divided into a 48.7 % **of males** (75 adolescents) and 51.3 % **of females** (79 adolescent). The study was conducted according to the Helsinki Declaration of 1961 (revised in Tokyo in 1989 and in Edinburgh in 2000) and was approved by the Research Ethics Committee of the University of Murcia (Spain).

Instruments

Physician-based Assessment and Counseling for Exercise (PACE) questionnaire was used. This questionnaire assesses with two questions how many days in the last week (PACE 1) and in a usual week (PACE 2) the subject do at least 60 min of physical activity. If the compound result obtained from both questions [(PACE 1 + PACE 2)/2] is ≥ 5 days, the subject is considered active (Prochaska et al, 2001; Martínez-Gómez et **al,** 2009). PACE questionnaire presents a test–retest reliability assessed by the Intraclass Correlation Coefficient (ICC) of 0.77. Although this questionnaire was validated with adolescents, it is very useful also in children due to its simplicity, ease of understanding and rapid implementation. In addition, PA recommendations in this questionnaire are the same as the PA recommendations of WHO for the age group of children and youth (5–17 years). The questionnaire was initially validated in English (Prochaska et al. 2001) and subsequently validated in Spanish (Martínez-Gómez et. **al. 2009).** Indian data was collected from English medium school. Therefore, English version of the questionnaire validated by Prochaska et al. (2001) was implemented in India, and for Spain questionnaire validated by Martínez-Gómez et. al. (2009) was used.

Procedure

The study was conducted with a quantitative, non-experimental, transversal and descriptive design, through surveys to determine the level of habitual physical activity of adolescent students. Questionnaires were filled in anonymously by the school children, in the year 2015. In the case of younger children, the possible doubts raised when completing the questionnaire were resolved by the researchers, teachers and parents/tutors. Research staff was in charge of contacting schools and distributing the questionnaires.

Statistical analysis

A statistical analysis was performed through the Statistical Package for Social Sciences 22 (SPSS-22). Descriptive statistics techniques were applied: frequencies, percentages, mean and standard deviation. Besides, *t*-test for independent samples was applied to analyze the differences between India and Spain.

Results

In Table 1, descriptive statistics are presented. In Table 2, results are compared using t-test. Finally, Table 3 shows the most important frequencies and percentages of the study.

Table 1. Descriptive statistics on Physician-based Assessment and Counseling for Exercise (PACE)

Country	Physician-based Assessment and Counseling for Exercise (PACE)	Sex	N	Mean	SD	SEM
India	PACE1	Male	36	3.86	1.79	.298
	How many days in the last week they exercised	Female	25	3.00	1.95	.391
	PACE2	Male	36	2.91	2.10	.350
	How many days in the usual week they exercised	Female	25	3.24	2.06	.413
Spain	PACE1	Male	39	3.38	2.15	.345
	How many days in the last week they exercised	Female	54	2.50	1.55	.211
	PACE2	Male	39	3.28	1.93	.309
	How many days in the usual week they exercised	Female	54	2.72	1.63	.221
India and Spain Combined	PACE1	Male	75	3.61	1.99	.230
	How many days in the last week they exercised	Female	79	2.65	1.69	.190
	PACE2	Male	75	3.10	2.01	.232
	How many days in the usual week they exercised	Female	79	2.88	1.78	.200

Country	Physician-based Assessment and Counseling for Exercise (PACE)	Sex	N	Mean	SD	SEM
India and Spain	PACE1 India	Male	36	3.86	1.79	.298
	PACE1 Spain	Male	39	3.38	2.15	.345
	PACE2 India	Male	36	2.91	2.10	.350
	PACE2 Spain	Male	39	3.28	1.93	.309
India and Spain	PACE1 India	Female	25	3.00	1.95	.391
	PACE1 Spain	Female	54	2.50	1.55	.211
	PACE2 India	Female	25	3.24	2.06	.413
	PACE2 Spain	Female	54	2.72	1.63	.221

Table 2. Comparison of results on Physician-based Assessment and Counseling for Exercise (PACE) using t-test

			Levene's Test for Equality of Variances		t-test for Equality of Means				
			F	Sig.	t	df	Sig. (2-tailed)	MD	SED
India	Pace1	Male	.162	.689	1.77	59	.081	.861	.484
		Female				48.72	.087	.861	.492
	Pace2	Male	.003	.956	-.595	59	.554	-.323	.543
		Female				52.34	.553	-.323	.541
Spain	Pace1	Male	5.72	.019	2.30*	91	.024	.884	.384
Spain		Female				65.10	.033	.884	.405
	Pace2	Male	.758	.386	1.51	91	.134	.559	.370
		Female				73.22	.146	.559	.380
India and Spain Combined	Pace1	Male (India)	1.68	.196	3.21*	152	.002	.955	.297
		Female (Spain)				145.42	.002	.955	.298
	Pace2	Male (India)	.948	.332	.721	152	.472	.220	.305
		Female (Spain)				147.66	.473	.220	.306
India and Spain	Pace1	Male (India)	1.887	.174	1.035	73	.304	.476	.460
		Male (Spain)				72.20	.300	.476	.456
	Pace2	Male (India)	.155	.695	-.784	73	.435	-.365	.465
		Male (Spain)				71.06	.437	-.365	.467
India and Spain	Pace1	Female (India)	1.305	.257	1.224	77	.225	.500	.408
		Female (Spain)				38.50	.268	.500	.444
	Pace2	Female (India)	1.266	.264	1.204	77	.232	.517	.430
		Female (Spain)				38.36	.277	.517	.469

'*' Significant at .05 level n = 154 Tab. $t_{.05}$ $(n_1+n_2-2=152)$ =1.96

Note: Pace1= how many days in the last week, Pace2= how many days in the usual week they exercised

Independent samples t-tests were conducted to compare all the Physician-based Assessment and Counseling for Exercise between Indian and Spain adolescent students. Significant differences were found on PACE 1 between Spanish males and females (t = 2.30, p>0.05): males (M = 3.38 ± 2.15), females (M = 2.50 ± 1.55). Another significant difference was seen on PACE1 between males and females (India and Spain combined, t = 3.21, p<0.05): Males-India (M = 3.61 ±1.99), female-Spain (M = 2.65 ±1.69). However, the other factors did not show any significant difference.

Table 3. Frequency information on Physician-based Assessment and Counseling for Exercise (PACE).

INDIA			**PACE1** (how many days in the last week they exercised)								**Total**
			0	1	2	3	4	5	6	7	
Sex	Male	Count	1	1	3	15	6	3	1	6	36
		%	2.8%	2.8%	8.3%	41.7%	16.7%	8.3%	2.8%	16.7%	100.0%
	Female	Count	2	4	5	5	4	2	1	2	25
		%	8.0%	16.0%	20.0%	20.0%	16.0%	8.0%	4.0%	8.0%	100.0%
Total		Count	3	5	8	20	10	5	2	8	61
		%	4.9%	8.2%	13.1%	32.8%	16.4%	8.2%	3.3%	13.1%	100.0%
			PACE2 (how many days in the usual week they exercised)								**Total**
Sex	Male	Count	1	8	12	7	0	1	2	5	36
		%	2.8%	22.2%	33.3%	19.4%	0.0%	2.8%	5.6%	13.9%	100.0%
	Female	Count	2	2	6	7	2	1	2	3	25
		%	8.0%	8.0%	24.0%	28.0%	8.0%	4.0%	8.0%	12.0%	100.0%
Total		Count	3	10	18	14	2	2	4	8	61
		%	4.9%	16.4%	29.5%	23.0%	3.3%	3.3%	6.6%	13.1%	100.0%
SPAIN						**PACE1** (how many days in the last week they exercised)					**Total**
Sex	Male	Count	4	5	4	9	5	5	2	5	39
		%	10.3%	12.8%	10.3%	23.1%	12.8%	12.8%	5.1%	12.8%	100.0%
	Female	Count	6	5	22	6	9	5	0	1	54
		%	11.1%	9.3%	40.7%	11.1%	16.7%	9.3%	0.0%	1.9%	100.0%
Total		Count	10	10	26	15	14	10	2	6	93
		%	10.8%	10.8%	28.0%	16.1%	15.1%	10.8%	2.2%	6.5%	100.0%
						PACE2 (how many days in the usual week they exercised)					**Total**
Sex	Male	Count	3	3	8	9	8	2	2	4	39
		%	7.7%	7.7%	20.5%	23.1%	20.5%	5.1%	5.1%	10.3%	100.0%
	Female	Count	5	4	21	8	6	8	1	1	54
		%	9.3%	7.4%	38.9%	14.8%	11.1%	14.8%	1.9%	1.9%	100.0%
Total		Count	8	7	29	17	14	10	3	5	93
		%	8.6%	7.5%	31.2%	18.3%	15.1%	10.8%	3.2%	5.4%	100.0%
COMBINED						**PACE1** (how many days in the last week they exercised)					**Total**
Sex	Male	Count	5	6	7	24	11	8	3	11	75
		%	6.7%	8.0%	9.3%	32.0%	14.7%	10.7%	4.0%	14.7%	100.0%
	Female	Count	8	9	27	11	13	7	1	3	79
		%	10.1%	11.4%	34.2%	13.9%	16.5%	8.9%	1.3%	3.8%	100.0%
Total		Count	13	15	34	35	24	15	4	14	154
		%	8.4%	9.7%	22.1%	22.7%	15.6%	9.7%	2.6%	9.1%	100.0%
						PACE2 (how many days in the usual week they exercised)					**Total**
Sex	Male	Count	4	11	20	16	8	3	4	9	75
		%	5.3%	14.7%	26.7%	21.3%	10.7%	4.0%	5.3%	12.0%	100.0%
	Female	Count	7	9	27	15	8	9	3	4	79
		%	8.9%	7.6%	34.2%	19.0%	10.1%	11.4%	3.8%	5.1%	100.0%
Total		Count	11	17	47	31	16	12	7	13	154
		%	7.1%	11.0%	30.5%	20.1%	10.4%	7.8%	4.5%	8.4%	100.0%

Discussion

The results of this study can be compared with those of other studies that have focused on the analysis of the level of habitual physical activity in school children and adolescents. In the scientific literature, most of the authors study the level of habitual physical activity in schoolchildren older than 10 years. Firstly, the results of this study are discussed with studies that have used the same questionnaire (PACE) and later with studies that have used other questionnaires.

Prochaska et al (2001) applied the PACE questionnaire to a sample of 250 subjects (140 girls and 110 boys) from San Diego (California) and Pittsburgh (Pennsylvania), with a mean age of 14.6 years (SD=1.4 years), and they found the following results: the subjects of the sample performed physical activity (60 minutes or more) an average of 2.4 days a week (SD=1.9). According to the results of the present study, adolescents from Spain and India are slightly more active than the adolescents from California.

Martínez-Gómez et al (2009) applied PACE questionnaire to a sample of 200 adolescents (99 boys and 101 girls) of the Community of Madrid (Spain), aged between 13 and 17 years, and they found the following results: boys performed physical activity (60 minutes or more) an average of 3.42 days per week (SD=1.52), while girls performed an average of 2.48 days per week (SD=1.42). These results are very similar to the results of the present study.

Regarding the comparison of this study with studies that used other questionnaires, Castells et al (2006), in a sample of 2400 schoolchildren from Barcelona aged 11 to 13 years, note that 83% of school children do some kind of physical activity or sport, so the other 17% were completely inactive. Vera (2006), with a sample of 1087 10-11 year-old school children from the Region of Murcia, indicated that 86.5% of the school children practiced physical activity some time per week. In the same vein, García (2011) carried out a study with 1200 10-12 year-old schoolchildren from the Region of Murcia and observed that 79.4% of schoolchildren practiced physical exercise outside of school. However, in the present study only ~ 5% of Indian adolescents and ~ 10% of Spanish adolescents declared to practice physical activity zero days per week, so the other adolescents do some type of physical activity, although this physical activity is not in all the cases enough according to the recommendations of the WHO.

Romero et al (2008), in a study with 112 12-year-old schoolchildren in the province of Málaga, found that only 14% of school children did daily physical activity in their leisure time. Instead, in the present study, only ~ 13% of Indian adolescents and ~ 6% of Spanish adolescents do at least 60 minutes of physical activity 7 days a week.

Hernández et al (2007) carried out a research with 2834 schoolchildren between 10 and 17 years from six Spanish cities of different regions, noting that a high percentage of students (66.2%) did physical and sporting activities outside the school more than 2 days per week. The study of Garcia (2011) with 1200 10-12 year-old school children from the Region of Murcia, by contrast, found that 36.7% of the school children performed physical and sporting activities 3 or more days a week. Nevertheless, in the present study ~ 62% of Indian adolescents and ~ 52% of Spanish adolescents performed at least 60 minutes of physical activity more than 2 days a week.

Conclusions

The main conclusions obtained in this research, according to the sample studied, were as follows:

The 13-year-old adolescents from Spain do not do enough physical activity, according to the recommendations of the WHO. The 80.5% of the Spanish adolescents studied are inactive considering the classification of PACE questionnaire.

The 13-year-old adolescents from India do not do enough physical activity, according to the recommendations of the WHO. The 76% of the Indian adolescents studied are inactive considering the classification of PACE questionnaire.

These results suggest that the practice of physical activity in adolescents must be increased in both countries. One possible way to increase the practice of regular physical activity in school children would be to carry out multidisciplinary programs that reinforce the habits of physical and sporting activities in the school children. From the field of Physical Education, with the support of local authorities, programs of physical activity and sport should be implemented, trying to spark an interest among the schoolchildren, especially in females. Besides, parents should be taken into account because their influence and the education they give to their children is essential.

It is convenient choosing only one baseline questionnaire to measure the level of habitual physical activity in children and adolescents, which allows a simple and direct comparison between different samples. The use of different questionnaires generates confusion and makes more difficult the discussion of results with other researches.

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