

Characteristics of physical activity during recess: an analysis with Galician Elementary and Secondary Education students

Myriam Alvariñas-Villaverde^{1,2,3}, Margarita Pino-Juste^{1,2,4}, Jorge Soto-Carballo^{1,2,5}

¹Facultad de Ciencias de la Educación y del Deporte, Universidad de Vigo, Pontevedra. ²Grupo de investigación en Educación, Actividad Física y Salud (GIES10), Instituto de Investigación Sanitaria Galicia Sur (IIS Galicia Sur). ³SERGAS-UVIGO. ⁴Licenciada en Educación Física. Doctora en Educación Física. ⁵Licenciada en Filosofía y Ciencias de la Educación. Doctora en Ciencias de la Educación. ⁶Licenciado en Filosofía y Ciencias de la Educación. Doctor en Pedagogía.

Recibido: 28/06/18
Aceptado: 26/11/18

Summary

Introduction: The analysis of the characteristics of physical activity during recess is highly important in the fight against childhood obesity rates and the sedentary lifestyle at an early age. There is a need to broaden the knowledge on this topic, delving into the types of activities, their intensity, the geographical area in which they are carried out, etc. Thus, the purpose of this study was to examine the characteristics of physical activity during recess in the last two years of Elementary Education and Compulsory Secondary Education in schools of the Atlantic axis.

Material and method: The study involved 707 students from Galicia (Spain). 49.08% were male students with an average age of 13.25 ± 1.76 years and 50.91% were female students, with an average age of 13.22 ± 1.77 years. The independent variables were sex, educational level and grade. The dependent variables included the activities performed during recess and their intensity. Data collected used the Recess Physical Activity Recall (Martínez-Gómez *et al.*, 2010) instrument.

Results: It was found that recess time was basically spent eating, resting, going down or up the stairs. Girls played mostly sports for the fun of it and walked more. Boys practiced more competitive sports. The intensity of physical activity was low, with male students and elementary school students being significantly more active.

Conclusions: The time that students spend practicing sports is very limited. The choice of sports is different depending on the sex. The highest activity rates occur after the first ten minutes and are maintained until the end of recess. Greater efforts are needed to change the culture of recreation, optimize time and redesign spaces, placing the focus especially on women and Secondary Education students.

Key words:

Playground. Physical activity levels. Promoting exercise.

Características de la actividad física en el recreo: un análisis con alumnado gallego de educación primaria y secundaria

Resumen

Introducción: El análisis de las características de la actividad física durante el recreo es de gran importancia en la lucha contra las tasas de obesidad infantil y el estilo de vida sedentario en edades tempranas. Se necesita ampliar el conocimiento sobre este tema, profundizando en la tipología de actividades, su intensidad, la zona geográfica, etc. Por ello, el objetivo de este estudio fue examinar las características de la actividad física durante el recreo en los dos últimos cursos de Educación Primaria y en Educación Secundaria Obligatoria en centros del eje atlántico.

Material y método: El estudio incluyó a 707 estudiantes de Galicia (España). El 49,08% son varones con una edad media de $13,25 \pm 1,76$ años y el 50,91% son mujeres, con una edad media de $13,22 \pm 1,77$ años. Las variables independientes fueron sexo, etapa educativa y curso. Las variables dependientes incluyeron las actividades realizadas durante el recreo y su intensidad. El instrumento utilizado para la recogida de datos fue el *Recess Physical Activity Recall* (Martínez-Gómez *et al.*, 2010).

Resultados: El tiempo de recreo se pasaba básicamente comiendo, descansando, bajando o subiendo las escaleras. Las niñas practicaban fundamentalmente deportes con un objetivo no competitivo (para divertirse) y caminaban más. Los niños practicaron más deportes competitivos. La intensidad de la actividad física fue baja, siendo los varones y el alumnado de primaria significativamente más activos.

Conclusiones: El tiempo que el alumnado dedica a ejercitarse en deportes es muy bajo. La elección de deportes es diferente en función del sexo. Los mayores índices de actividad se producen pasados los diez primeros minutos y se mantienen hasta el final. Son necesarios mayores esfuerzos para cambiar la cultura del recreo, optimizar el tiempo y rediseñar los espacios, poniendo el foco de atención especialmente en las mujeres y el alumnado de Educación Secundaria.

Palabras clave:

Recreos. Niveles de actividad física. Promoción del ejercicio.

Correspondencia: Myriam Alvariñas-Villaverde
E-mail: myalva@uvigo.es

Introduction

The importance of physical activity for health is thoroughly proven. It reduces the incidence of cardiovascular diseases, diabetes, hypertension, obesity, depression, osteoporosis and some forms of cancer¹. Obesity is currently a high-prevalence health problem, which affects the body in multiple ways². For this reason, in recent years, there has been an urgent need to implement educational interventions to reduce excess weight in children and youth³⁻⁵.

For years, the European institutions have warned that many children only engage in physical activity (PA) during school hours⁶. At school, in addition to the amount of hours dedicated to Physical Education, students have recess multiple times throughout the day as a resource for the promotion of a healthy lifestyle. Recess can be defined as a non-curricular break period between classes, where students engage in leisure activities⁷. It often includes lunchtime⁸. Therefore, it refers to a resting time frame, while the playground is the recreational area.

Over the past decade, many researchers have emphasized the importance of recess as an opportunity to increase physical and sport activities⁹⁻¹².

It is well known that the World Health Organization¹³ advises Elementary and Secondary Education students to perform daily PA in the form of games, sports, travel, recreational activities, etc. in the context of family, school and community. It particularly recommends at least 60 minutes of moderate-to vigorous-intensity PA (MVPA) each day; it also recommends aerobic exercises and movements that reinforce muscles and bones at least three times a week. Pate *et al.*¹⁴ have suggested that at least half of the recommended MVPA for health reasons could be carried out in the school context. Lopes *et al.*¹⁰ have also drawn the same conclusion, pointing out that this is an achievable goal.

The inclusion of PA during recess may have significant implications for health and physical, social and cognitive development, as shown by Serra¹⁵ in a review of different studies. So that playtime could contribute to the daily PA, it should be of moderate intensity for at least 40% of the time⁷.

Therefore, the analysis of the characteristics of PA during recess is highly important in the fight against childhood obesity rates^{16,17} and the sedentary lifestyle at an early age¹⁸ since during this period everyone has the opportunity of being physically active⁹. Actually, the study carried out by Martínez *et al.*¹⁹ has shown that recess highly contributes to the weekly amount of PA that students perform. In the same vein, although only related to male subjects, the work conducted by Aznar *et al.*²⁰ has indicated the existence of high peaks of MVPA, which corresponds to school playtime.

Despite this, as shown by Frömel *et al.*²¹ the information on the type of physical activity and its intensity during recess is insufficient. Hence, the need to expand the knowledge on this subject, taking into account different variables of influence. One of them is related to the study of these issues in different geographical areas; for example, in Spain, in different autonomous communities or provinces, since the climatological and cultural characteristics are different.

Therefore, the research problem focuses on characterizing the type of activities and their intensity, depending on variables such as gender or the educational stage in a Galician area; in particular, the Atlantic

axis (Pontevedra and A Coruña). Therefore, and as an objective, this study focuses on analyzing the characteristics of physical activity during recess in the last two years of Elementary Education and Compulsory Secondary Education in schools of the Atlantic axis.

Material and method

A quasi-experimental cross-sectional study was performed by means of a non-probability convenient sampling technique, where the independent variables were sex, educational level and grade. The dependent variables included the activities performed during recess and their subjective intensity of PA.

Participants

The study involved 707 students from Elementary and Secondary schools in the Atlantic axis of the Autonomous Community of Galicia (Spain). The Atlantic axis covers the provinces of Pontevedra and A Coruña, which have about 944,346, and 1,122,799 inhabitants, respectively. Its coast, where most of the Galician productive sector is located, is bathed by the Atlantic Ocean.

The schools were selected randomly and the sampling was intentional. There were six participating schools, all of them located in an urban area, with the classrooms on the second floor. Out of these, three belonged to the province of Pontevedra, and three to the province of A Coruña. Likewise, in each province, two were Early Childhood and Elementary Education schools, and one Secondary Education school.

49.08% of the participants were male students with an average age of 13.25 ± 1.76 years and 50.91% were female students, with an average age of 13.22 ± 1.77 years. 229 were enrolled in 5th and 6th grade of Elementary Education, 248 were enrolled in 1st and 2nd grade of Compulsory Secondary Education and, finally, 230 were enrolled in 3rd and 4th grade of Compulsory Secondary Education.

Instrument

For the collection of data, the Recess PA Recall (RPAR) elaborated by Martínez-Gómez *et al.*²² was employed. This questionnaire divides recess into 5-minute fractions, and for each fraction participants had to indicate the type of activity that had been performed and with what intensity: very mild, mild, moderate and vigorous. The activities were codified and grouped into five categories (eating, active transportation, rest, hobbies, and physical activities). In addition, participants were provided with the option of adding new activities.

The used test (Martínez-Gómez *et al.*)²² has a limited impact, although there is the advantage that it is a study of validity on the Spanish population.

Procedure

The study was conducted according to the ethical standards established by the Declaration of Helsinki (revised by the Declaration of Hong Kong, September 1989) and in agreement with the recommendations of EEC - Good Clinical Practice (Document 111/3976/88, July 1990) and with the Spanish legislation in force governing research.

The questionnaire was collectively administered during regular school hours, during the academic year 2016-2017. It is administered only once, during the winter season; given the Galician climate, we assumed that we could start from that point, considering that less physical activity is performed at this time. In the future, the same study should be performed in spring or summer, to observe whether there are any differences. After communicating the appropriate instructions and once the informed consent form was signed (by school and families), all students voluntarily completed the requested information.

Data analysis

First, a descriptive analysis was carried out for the items, showing the mean, standard deviation, as well as the asymmetry and kurtosis indices used to assess the normal behavior of variables.

Pearson's χ^2 tests were performed to determine the association between the nominal variables, Student's *t*-tests to compare independent means for continuous dichotomous variables, and ANOVA for polytomous variables with a significance level of $p < .05$. Subsequently, the relationship between the different levels of PA intensity during successive recesses were analyzed using Pearson's correlation coefficients.

Data analysis was performed using the SPSS 23.0 statistical package.

Results

Considering that in Elementary Education there is only one 30-minute recess and in Secondary Education two 20-minute recesses, the

analysis focused on the activity during the first 20 minutes in both stages in order to compare them.

In the first five minutes the activity consists of going down the stairs and having a sandwich. After 10 or 15 minutes, the fundamental activity consists of walking, but also of playing games for fun and competitive sports. Finally, at minute 20, these games continue, students rest and go up the stairs. It is important to note that resting was always codified as a very light activity.

Since the temporal characteristics of the recess in Elementary and Secondary schools are not the same, the differences between them were analyzed within five and twenty minutes (Table 1).

The differences between educational levels are significant. Students usually spend the recess time eating, resting, going down or up the stairs. The number of students who engage in competitive and fun sports is very low. The performance of physical and sport activities is substantially higher within 20 minutes than within 5, both in Elementary and Secondary Education. In Elementary Education, a greater number of students practice competitive sports, regardless of the time frame (Table 1).

The proportion of students participating in activities differs according to gender ($\chi^2 = 77.45$, $gl = 2$, $p < .001$). Girls play more sports for the fun of it and walk more. Boys practice more competitive sports (Table 2).

The intensity of the PA performed is relatively low, since its trend is 2 (mild). It is obviously higher as recess progresses, becoming lower over the final minutes. In terms of asymmetry values, it was observed that the bias was positive in all cases except at minute 15. Hence, one can state that this distribution has an asymmetric tail extending toward negative values; that is, it tends to be skewed to the right side of the mean, where there are high values, but only at minute 15. On the con-

Table 1. Frequency and percentage of activities performed within 5 and 20 minutes, compared by educational level.

	Frequency and percentage of activities within 5 minutes				χ^2	Frequency and percentage of activities within 20 minutes				χ^2
	Secondary Education		Elementary Education			Secondary Education		Elementary Education		
	Freq.	%	Freq.	%		Freq.	%	Freq.	%	
Eating	151	78.2	42	21.8	.0001	42	85.74	7	14.3	.0001
Walking	78	60.9	50	39.1		55	80.9	13	19.1	
Going up the stairs	13	54.2	11	45.8		85	94.4	5	5.6	
Going down the stairs	137	67.1	67	32.9		20	80	5	20	
Resting	18	81.8	4	18.2		71	82.6	15	17.4	
Listening to music	2	100	0	0		3	75	1	25	
Playing video-games	0	0	0	0		4	80	1	20	
Talking on the cell phone	4	100	0	0		16	100	0	0	
Reading	3	50	3	50		7	46.7	8	53.3	
Studying or doing homework	5	71.4	2	28.6		12	70.6	5	29.4	
Walking to exercise	4	80	1	20		11	64.7	6	35.3	
Running	11	50	11	50		18	53	16	47	
Skating	1	100	0	0		5	50	1	50	
Dancing	0	0	0	0		4	83.3	4	16.7	
Games and sports (for fun)	16	64	9	36		63	52.1	58	47.9	
Competitive games and sports	14	35.9	25	64.1		32	32.7	66	67.3	
Others	21	84	4	16		30	62.5	18	37.5	

Note. $p < .01$.

Table 2. Activities carried out up to Minute 20 according to sex.

		Sex		Total
		Male	Female	
Eating	Freq.	20	29	49
	%	5.8%	8.1%	6.9%
Walking	Freq.	26	42	68
	%	7.5%	11.7%	9.6%
Going up the stairs	Freq.	45	45	90
	%	13.0%	12.5%	12.7%
Going down the stairs	Freq.	6	19	25
	%	1.7%	5.3%	3.5%
Resting	Freq.	39	47	86
	%	11.2%	13.1%	12.2%
Listening to music	Freq.	3	1	4
	%	.9%	.3%	.6%
Playing video-games	Freq.	5	-	5
	%	1.4%	.0%	.7%
Talking on the cell phone	Freq.	8	8	16
	%	2.3%	2.2%	2.3%
Reading	Freq.	6	9	15
	%	1.7%	2.5%	2.1%
Studying or doing homework	Freq.	4	13	17
	%	1.2%	3.6%	2.4%
Walking (to exercise)	Freq.	10	7	17
	%	2.9%	1.9%	2.4%
Running	Freq.	11	23	34
	%	3.2%	6.4%	4.8%
Dancing	Freq.	3	5	8
	%	.9%	1.4%	1.1%
Skating	Freq.	1	5	6
	%	.3%	1.4%	.8%
Games/sports (for fun)	Freq.	56	65	121
	%	16.1%	18.1%	17.1%
Competitive games/sports	Freq.	82	16	98
	%	23.6%	4.4%	13.9%
Others	Freq.	22	26	48
	%	6.3%	7.2%	6.8%
Freq.		347	360	707
% of students' gender		100%	100%	100%
% of the total		49.1%	50.9%	100%

Table 3. Intensity of PA during the first 20 minutes.

	Intensity				
	Minute 5	Minute 10	Minute 15	Minute 20	Mean 20 M
Mean	2.05	2.28	2.44	2.43	2.2988
Median	2.00	2.00	3.00	2.00	2.2500
Trend	1	1	3	3	2.50
Standard deviation	.999	1.045	1.081	1.090	.81652
Asymmetry	.545	.203	-.020	.042	.070
Standard error of the asymmetry	.092	.092	.092	.092	.092
Kurtosis	-.827	-1.180	-1.286	-1.299	-.856
Standard error of the kurtosis	.184	.184	.184	.184	.184
Minimum	1	1	1	1	1.00
Maximum	4	4	4	4	4.00

Table 4. Difference of intensity means in the first 20 minutes of recess according to sex.

	Sample		Levene's test		Student's t-test	
	Boys (n = 347)	Girls (n = 360)	F	Sig.	t	Sig. (bilateral)
Intensity	2.434±.83	2.16±.78	.221	.63	4.39	.0001
Mean 20 M.						

Note. Values are presented as mean ± standard deviation.

Table 5. Difference of intensity means in the first 20 minutes according to grade.

	N	Mean	F	Sig.	Groups	Bonferroni Sig*
1st G-CSE	101	2.2822			5th G-PE	.003
					6th G-PE	.0001
2nd G-CSE	147	2.0969			5th G-PE	.0001
					6th G-PE	.0001
3rd G-CSE	121	1.9793			5th G-PE	.0001
					6th G-PE	.0001
4th G-CSE	109	2.0734			5th G-PE	.0001
					6th G-PE	.0001
5th G-PE	111	2.6734	21.776	.0001	1st G-CSE	.003
					2nd G-CSE	.0001
6th G-PE	118	2.7479			3rd G-CSE	.0001
					4th G-CSE	.0001
					1st G-CSE	.0001
					2nd G-CSE	.0001
					3rd G-CSE	.0001
					4th G-CSE	.0001

Note. *The mean difference is significant at the level of .05; Note. G-PE: Grade of Elementary Education; G-CSE: Grade of Compulsory Secondary Education.

trary, the distribution of the other variables has a positive bias, thus their values tend to be skewed to the right side of the mean, where there are low values. In the case of kurtosis, it was found that all distributions were negative, thus the distribution of the sample is platykurtic, which means that the concentration of the values in the central region of the distribution is low (Table 3).

Table 4 shows the subjects of the sample, classified according to gender. Our study sample was made up of 360 girls and 347 boys, that is why one could say that gender representation was equitable.

In the Levene's test for equality of variances, the value of the Levene's f contrast statistic is $f = .221$ and its associated statistical significance is $p = 0.638$. Therefore, the equality of variances is fulfilled. In the Student's t-test, the value of the contrast statistic is $t = 4.392$ and its statistical

Table 6. Difference of intensity means in the first recess according to students' educational level.

	Sample (n = 707)		Levene's test		Student's t-test	
	Elementary Education (n=229)	Secondary Education (n=478)	F	Sig.	t	Sig. (bilateral)
Activity intensity	2.73±.705	2.100±.774	7.146	.838	-10.49	.0001

significance is lower than .001. It is concluded, in this case, that there are significant differences in the average intensity of PA performed during recess, higher in boys than in girls.

Table 5 shows there are differences between grades with respect to the PA intensity ($f = 21.776$, sig. < .0001). This suggests that Elementary students perform higher-intensity PA for the first 20 minutes of recess than Secondary students.

If we take into account the total number of recess minutes in Elementary (30 minutes) and Secondary Education (20 minutes), it is observed that intensity is still higher in the former (Table 6).

Discussion

This study is a novel approach to determine the typology and intensity of PA during recess in the last two years of Elementary Education and Compulsory Secondary Education in schools of the Atlantic axis (Galicia, Spain). This applies despite the fact that its climatological and cultural characteristics are different from other communities, in which other studies were carried out on PA during recess in Spain^{20,23-26} and at international level²⁷⁻²⁹.

The interest of this study lies in the fact that, generally, the levels of activity at these ages are considerably lower than the recommended guidelines. This is important because in Elementary Education, 30 minutes of daily recess mean two and a half hours of possible PA each week, which is a very important percentage¹⁹. This amount of time is even longer in Secondary Education, as it exceeds three hours. In other words, recess can make a valuable contribution to the recommended 60 minutes of daily PA³⁰. It should be borne in mind that children are usually more active during school playtime compared to activities performed outside the school or on weekends³¹.

Our research proves that students usually spend the recess time eating, resting, going down or up the stairs and as recess progresses, they perform fun and competitive sports. However, these sports account for a rather small percentage. The intensity of this physical activity is low. The highest activity rates occur after the first ten minutes and are maintained until the end of recess. There is also an increase of the number of students who play games and sports, or dance starting from that time frame.

There are differences according to the educational level, Elementary students being more active. This difference in intensity between educational levels was confirmed by other studies^{20,23}. There were differences also between the first two grades of Secondary Education and the last two, as students of the first grades performed higher levels of PA¹⁵. The work conducted by Martínez-Gómez *et al.*²⁶ also revealed that

the group of younger adolescents was more active than the older group, but this difference occurs only in boys. On the other hand, Wollersheim and DiPerna³² compared sixth- and first-grade students and detected that sixth-grade males engaged in significantly more PA during recess.

On the other hand, as is often the case, it was observed that male students exhibit more sporting activity than female students. Recent studies, conducted in different countries, which focused on PA during recess according to gender, have reached the same conclusions. It has been stated that boys are physically more active than girls^{24,26, 33,34}. In any case, certain exceptions have been reported. As an exception, in a study conducted by Mota *et al.*³⁵, among students aged 8 to 10, girls were significantly more active than boys during recess. According to Martínez-Gómez *et al.*²² there were no differences according to gender in a group of adolescents aged between 12 and 14 years old.

It should be noted that girls play more sports for the fun of it and walk more. Boys practice more competitive sports. These data are in agreement with other literature contributions. There have always been differences in the type of activity in which boys and girls engage^{27,36}. In fact, boys often participate in moderate to vigorous team sports activities, which usually have a competitive element. Girls tend to be more involved in lower-intensity activities, such as talking, walking, or jumping rope²⁸.

Certain studies showed that boys saw recess as an opportunity to participate in competitive games, while girls saw it as an opportunity to socialize with friends³⁷. Therefore, it may seem logical to think that, given the intensity of PA during school recess, boys have a higher energy expenditure than girls^{25,19,15}.

The observed data suggest the need to increase the levels of physical activity, mainly in women and in Secondary Education. For this reason, and as preventive lines of action, the following recommendations are provided to redesign and boost recess time:

Regarding the agents involved:

- The educational community should be aware of its potential to be an active part of the change process of recess. Families can collaborate in the creation of new spaces, and reconditioning or re-adaptation of others. Family can also encourage students to make the most of recess times, by performing physical exercise.
- The teaching staff is a key element in the intervention programs that could be carried out. They are able to analyze the benefits of sports practice based on different variables, such as gender or grade, and implement strategies that favor the participation of all. In any case, it is worth mentioning that sometimes the intensity of physical activity during recess is higher without teachers' guidance⁹.

- Students are the focal point of the intervention processes. The figure of playground mediators or recess mediators will help to understand what factors limit the physical activity practice and to settle conflicts.
- Moreover, in our opinion, setting up the figure of recess time sports facilitator is of great interest. It would be a similar figure to that of game coordinator from the study conducted by Chin and Ludwig³⁸. This person's role would be to promote playgrounds as attractive environments for the performance of physical activity. In addition to an organization and supervision function, they could advise the school staff so that they could continue the work later in their absence. The *sports facilitator* can be employed by the municipal government or by health centers, and performs community health tasks.

Regarding time:

- Given the impact that recess may have on students' overall physical activity, an interesting alternative may be to lengthen the time spent performing it, and even increase the number of recesses. In addition, particular attention must be paid to the real time of practice, which should be as long as possible, and participation should take place from the very beginning.

Regarding space:

- The need to optimize the space during recess is very important. Molins-Pueyo³⁹ pointed out the poor and limited use of the playground as an educational space, falling short when it comes to deepening the possibilities offered. Students must have different possibilities in terms of space for the practice of physical activity. The existence of recreational areas should also be ensured when the weather conditions do not allow practicing outdoors.
- The space could be redesigned considering simple alternatives, such as painting floors or walls. Stratton and Mullan³⁴ concluded in their study that painting playgrounds with multicolored marks was a low-cost method to increase the percentage of time spent on MVPA.
- In terms of gender, Lamedona and Huertas²⁵ have pointed out measures beneficial for girls, such as: facilitating a play area to avoid the tendency of boys to take up spaces, offering tasks of separate space use, or performing activities indoors.

Regarding materials:

- Facilitating the use of Physical Education material is a strategy that can be very motivating. These materials offer a possibility to carry out more physical and sport activities, educate students in values, and favor the interpersonal relations among peers⁴⁰. This was verified by Lopes *et al.*¹⁰ or Verstraete *et al.*⁴¹, providing sports equipment during recess. This resulted in a significant increase in the percentage of time spent on PA.
- In addition, using disposable materials is another formula to create a playground that encourages motor learning. Reusing materials such as tires or cylindrical containers, making them part of the playground furniture can be a practical and cheap option, as well as of a high pedagogical value.

Regarding contents:

- When it comes to programming recess improvement interventions, contents should be diversified, based on students' interests. Preference for sports practice varies depending on gender, age or ability.

The existing possibilities of participation, organized according to resources available in the environment, should be equitable. Certain positive action measures may also be interesting, for encouraging secondary education girls to practice physical activity.

As a limitation of the present study, and also as a future line of work, the use of accelerometers should be considered, as they would provide more objective data for the group under study. In addition, it would be interesting to check in further research the characteristics of practice in other seasons.

Conclusions

School recesses could be relied on to increase PA levels and, consequently, as a disease prevention factor. The time that students spend practicing sports is very limited. The choice of sports is different depending on the sex. The highest activity rates occur after the first ten minutes and are maintained until the end of recess. The culture of recess should be changed and redesigned so that it could become more attractive for activity practice placing the focus especially on women and Secondary Education students. Recommendations are made regarding the agents involved, spaces, time, materials and contents used.

Conflict of interest

The authors do not declare a conflict of interest.

Bibliography

1. Lee M, Shiroma E, Lobelo F, Puska P, Blair S, Katzmarzyk P. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*. 2012;380(9838):219-29.
2. Zhang L, Qin LQ, Liu AP, Wang PY. Prevalence of risk factors for cardiovascular disease and their associations with diet and physical activity in suburban Beijing, China. *J Epidemiol*. 2010;20(3):237-43.
3. Del Águila CM. Obesity in children: risk factors and strategies for its prevention in Peru. Obesidad en el niño: factores de riesgo y estrategias para su prevención en Perú. *Rev Peru Med Exp Salud Publica*. 2017;31(1):113-8.
4. Lineros-González C, Marcos-Marcos J, Ariza C, Hernán-García M, Previene G. The importance of the process in evaluating the effectiveness of a childhood obesity campaign. *Gac Sanit*. 2017;31(3):238-41.
5. Rajmil L, Bel J, Clofent R, Cabezas C, Castell C, Espallargues M. Clinical interventions in overweight and obesity: a systematic literature review 2009-2014. *An Pediatr*. 2017;86(4):197-212.
6. Centers for Disease Control and Prevention (CDC). Physical activity levels among children aged 9–13 years-United States, 2002. *MMWR Morb Mortal Wkly Rep*. 2003;52(33):785-8.
7. Ridgers ND, Stratton G, Fairclough S. Physical activity levels of children during school playtime. *Sports Med*. 2006;36(4):359-71.
8. Parrish AM, Okely, AD, Stanley RM, Ridgers ND. The effect of school recess interventions on physical activity. A systematic review. *Sports Med*. 2013;43:287-99.
9. Hall-López JA, Ochoa-Martínez PY, Zuñiga R, Monreal, LR, Sáenz-López P. Moderate-to-vigorous physical activity during recess and physical education among Mexican elementary school students. *Retos*. 2017;31:137-9.
10. Lopes L, Lopes V, Pereira B. Physical activity levels in normal weight and overweight Portuguese children: an intervention study during an elementary school recess. *Int Electron J Health Educ*. 2009;12:175-84.
11. Mays-Woods A, Graber K, Daum D. Children's recess physical activity: movement patterns and preferences. *J Teach Phys Educ*. 2012;31:146-62.

12. Ridgers ND, Fairclough SJ, Stratton G. Variables associated with children's physical activity levels during recess: the A-CLASS Project. *Int J Behav Nutr Phys Act.* 2010;7(74).
13. World Health Organization. *Global recommendations on Physical Activity for Health.* Geneva. World Health Organization; 2010. p. 18-20.
14. Pate RR, Davis MG, Robinson TN, Stone EJ, McKenzie TL, Young JC. Promoting physical activity in children and youth – a leadership role for schools – a scientific statement from the American Heart Association Council on Nutrition, Physical Activity, and Metabolism (Physical Activity Committee) in collaboration with the Councils on Cardiovascular Disease in the Young and Cardiovascular Nursing. *Circulation.* 2006;114:1214-24.
15. Serra JR. Análisis de la práctica de actividad física durante el recreo escolar en adolescentes de la provincia de Huesca. *Arch Med Deporte.* 2014;31(4):257-62.
16. Estudio ALADINO 2015. *Estudio de Vigilancia del Crecimiento, Alimentación, Actividad Física, Desarrollo Infantil y Obesidad en España 2015.* Agencia Española de Consumo, Seguridad Alimentaria y Nutrición. Ministerio de Sanidad Servicios Sociales e Igualdad; 2016. p. 17.
17. Sánchez-Cruz JJ, Jiménez-Moleón JJ, Fernández-Quesada F, Sánchez MJ. Prevalencia de la obesidad infantil y juvenil en España en 2012. *Rev Esp Cardiol.* 2012;66(5):371-6.
18. Janssen I, LeBlanc A. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *Int J Behav Nutr Phys Act.* 2010;7(40):1-16.
19. Martínez J, Aznar S, Contreras O. El recreo escolar como oportunidad de espacio y tiempo saludable. *RIMCAFD Rev Int Cienc Act Fis Deporte.* 2015;15(59):419-32.
20. Aznar S, Naylor PJ, Silva P, Pérez M, Angulo T, Laguna M, et al. Patterns of physical activity in Spanish children: a descriptive pilot study. *Child Care Health Dev.* 2011;37(3):322-8.
21. Frömel K, Svozil Z, Chmelik F, Jakubec L, Groffik D. The role of physical education lessons and recesses in school lifestyle of adolescents. *J Sch Health.* 2016;86(2):143-51.
22. Martínez-Gómez D, Calabro MA, Welk GJ, Marcos A, Veiga OL. Reliability and validity of a school recess physical activity recall in Spanish youth. *Pediatr Exerc Sci.* 2010;22(2):218-30.
23. Calahorra-Cañada F, Torres-Luque G, López-Fernández I, Carnero EA. Análisis fraccionado de la actividad física desarrollada en escolares. *J Sport Psychol.* 2015;2:373-9.
24. Escalante Y, Backx K, Saavedra J, García-Hermoso A, Domínguez A. Relación entre actividad física diaria, actividad física en el patio escolar, edad y sexo en escolares de educación primaria. *Rev Esp Salud Pública.* 2011;85(5):481-9.
25. Lamonedá J, Huertas FJ. Análisis de la práctica deportiva-recreativa a través de un programa de promoción en el recreo en función del sexo en adolescentes españoles. *Retos.* 2017;32:25-9.
26. Martínez-Gómez D, Veiga OL, Zapatera B, Gómez-Martínez S, Martínez D, Marcos A. Physical activity during high school recess in Spanish adolescents. *J Phys Health.* 2014;11:1194-1201.
27. Babkes-Stellino M, Sinclair C. Examination of children's recess physical activity patterns using the activities for daily living-playground participation (ADL-PP) instrument. *J Teach Phys Educ.* 2014;33:282-96.
28. Beighle A, Morgan C, Le Masurier G, Pangrazi Z. Children's physical activity during recess and outside of school. *J Sch Health.* 2010;76(10):516-20.
29. Massey WV, Stellino MB, Holliday M, Godbersen T, Rodia R, Kucher G, et al. The impact of a multi-component physical activity programme in low-income elementary schools. *Health Educ J.* 2017;76(5):517-30.
30. Ridgers ND, Stratton G. Physical activity during school recess: The Liverpool sporting playgrounds project. *Pediatr Exerc Sci.* 2005;17(3):281-90.
31. McCall S, McGuigan M, Nottle C. Contribution of free play towards physical activity guidelines for New Zealand primary school children aged 7-9 years. *Br J Sports Med.* 2009;45(2):120-4.
32. Wollersheim S, DiPerna JC. Engagement in physical activity during recess: gender and grade level differences in the elementary grades. *J Phys Health.* 2017;14:677-83.
33. Nettlefold L, McKay H, Warburton D, McGuire K, Bredin S, Naylor P. The challenge of low physical activity during the school day: at recess, lunch and in physical education. *Br J Sports Med.* 2010;45(10):813-9.
34. Stratton G, Mullan E. The effect of multicolor playground markings on children's physical activity level during recess. *Prev Med.* 2005;41(5-6):828-33.
35. Mota J, Silva P, Santos M, Ribeiro J, Oliveira J, Duarte J. Physical activity and school recess time: differences between the sexes and the relationship between children's playground physical activity and habitual physical activity. *J Sports Sci.* 2005;23(3):269-75.
36. Macdonald D, Rodger S, Abbott R, Ziviani J, Jones J. I could do with a pair of wings: perspectives on physical activity, bodies and health from young Australian children. *Sport Educ Soc.* 2005;10(2):195-209.
37. Blatchford P, Baines E, Pellegrini A. The social context of school playground games: sex and ethnic differences, and changes over time after entry to junior school. *Br J Dev Psychol.* 2003;21(4):481-505.
38. Chin JJ, Ludwig D. Increasing children's physical activity during school recess periods. *Am J Public Health.* 2013;103:1229-34.
39. Molins-Pueyo C. Patios escolares y diversidad sociocultural en cataluña. una investigación sobre usos y posibilidades para el juego y el aprendizaje. *Papers.* 2012;97(2):431-60.
40. García M, Serrano JM. La optimización del patio de recreo para favorecer la práctica de actividades físico-deportiva mediante un proyecto de convivencia. *Espiral. Cuadernos del Profesorado.* 2010;3(6):32-42.
41. Verstraete SJ, Cardon GM, De Clercq DL, De Bourdeaudhuij IM. Increasing children's physical activity levels during recess periods in elementary schools: the effects of providing game equipment. *Eur J Public Health.* 2006;16(4):415-9.