



## Research article

# Influence of the characteristics of the house and place of residence in the daily educational activities of children during the period of COVID-19' confinement



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## ABSTRACT

The period of confinement motivated by the COVID-19 pandemic and established by the governments of different countries has influenced the lifestyle of millions of children, not being able to continue carrying out multiple educational activities as they did until confinement. The objective of this research was to determine and analyze whether the living conditions of children during the period of confinement caused by COVID-19 influenced their daily educational activities. A descriptive, comparative and cross-sectional quantitative study with a non-experimental design was carried out, with a single measurement in a single group. Factors associate with living conditions were analyzed, such as the place of residence and the type of house in which Spanish children have been confined, as well as the number and use of technological devices. The parents' perception of the children's state of fatigue, happiness, energy and tiredness was also analyzed. We have worked with a sample of 837 Spanish children. As a data collection instrument, the validated questionnaire on Equipment and Use of Information and Communication Technologies in Households (TIC-H2019) of the National Statistics Institute (INE) was used, following the recommendations of the Statistical Office of the European Union (EUROSTAT).

The results confirm some statistically significant influence of the conditions of the house and place of residence on the daily time dedicated to different educational activities such as reading, physical activity, free play or use of technological devices between children residing in small flats and those residing in large flats or houses with garden and those residing in urban and rural settings.

## 1. Introduction

The 2019 coronavirus pandemic (COVID-19/SARS-CoV-2) has caused the majority of the world population to have restrictions in their day-to-day activities. In the educational field, teachers and children of all educational levels have had to get ahead of online teaching to be able to continue school classes, finding some families with the digital divide.

The COVID-19 pandemic urged many governments in different countries to stop non-essential work activity. This caused that the lifestyle of many people was affected, among them are children of compulsory school age (6–12 years) and those in early childhood education (0–6 years), who had to continue classes online and they were

unable to enjoy the extracurricular activities they did daily, such as do sports, playing musical instruments, theater, etc. In Spain, non-essential work activity stopped on March 15, 2020, the date on which the state of alarm was established, with a duration of several months (Government of Spain, 2020).

A recent study confirms that children during COVID-19 lockdown spent many hours sitting at home decreasing their physical activity. The greater amount of time sitting was not caused by schoolwork but by enjoyment of leisure time, such as playing the video game console, watching television or using the internet, which took up to 8 h a day compared to the average 90 min spent on homework (Genevieve et al., 2020).

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Medrano et al., (2020) conducted a study on the impact of COVID-19 confinement on the lifestyle of a sample of 291 children, noting changes in this caused by the period of confinement, reducing the time dedicated to physical activity and increasing the time dedicated to using screens. The prevalence of children that worsened their lifestyle behaviours during the COVID-19 confinement were 95.2% for PA, 69.8% for screen time, and 31.4% for the adherence to the Mediterranean diet, respectively. These authors conclude the importance of developing, promoting and implementing healthy lifestyle behaviour strategies and interventions for children in order to preserve their health during and after confinement for COVID-19.

The situation of restriction of children for sixty days and the change in their lives and relationships with peers for many more months can carry specific risks related to mental and physical health in the general population and especially in children, above all those who are of compulsory school age, whose current learning will mark their subsequent academic evolution and may generate a negative emotional state, promote sedentary lifestyles, decrease the quality of life or generate a detrimental impact on the well-being, health and affective relationships of people (Brooks et al., 2020; Giallonardo et al., 2020; Ricci et al., 2020).

The recurring news from the international media about COVID-19, the restriction to which the population has been subjected, some living together 24 h a day with their children, the situation as teachers in continuous contact with students, and the observation through the information obtained by phone calls, video calls, videoconferences or whatsapp groups of family, friends and colleagues, has led to the recognition of a problem that is the social and family concern for this situation and the great interest aroused in finding and provide solutions to possible present and future emotional and academic conflicts in children from 0 to 12 years old.

Perhaps, in addition to being a short and long-term medical problem, it is also a psychological and educational problem, an aspect that, from the Faculties of Educational Sciences, as training centers for future teachers, must be analyzed and foreseen solutions. Future teachers must be prepared to face exceptional situations that may provoke the abrupt change from participatory classroom teaching methodologies to methodologies more related to blended or online teaching. A large majority of schools have made a change in the orientation of teaching, adapting the contents taught in person to online teaching in record time (Mulla et al., 2020). However these changes were an obstacle for many students despite the goodwill of educational institutions. Some of the factors indicated by different studies were the lack of technological resources, difficulty connecting to the network and lack of training in the use of ICT, among others (Reyes-Chua et al., 2020; Tulaev et al., 2020), recommending more training in relation to the use of educational platforms for teachers and students.

The overuse of some technological devices by the child and youth population (Chamaro-Lusar et al., 2014; Cuesta-Cambra et al., 2020) has been aggravated during the period of restriction, constituting an educational problem for some families who had to promote greater education based on the search for strategies to promote collaboration in the environment family in daily household activities, in the promotion of physical or artistic activity or other activities necessary to promote a comprehensive education of the child. However, for some authors such as Matamala (2016), the use of technological means at home can be considered informal learning; for Formichella and Alderete (2018) its use at home will have a positive impact on educational performance; or the benefits that technological means can have in people's daily lives as a source of information and aid in communication between people (Garcés Jinés, 2012).

However, the use of technological means can become a problem even for children from 0 to 5 years, which is why the World Health Organization (WHO, 2019) alerts the situation by publishing a report on the use and abuse of screens in the child population to the detriment of physical activity and recommends games and exercise against the excessive use of technological devices by children, especially those who are younger

(Guthold et al., 2018). Spanish households have tablets, mobile phones, televisions, computers and game consoles; furthermore, 90% have internet access, 80% with a personal computer, 50.6% with a tablet, 90.8% with a mobile phone and 90.9% with television (Instituto Nacional de Estadística, 2019), many of them with a TV in every room.

The increase in physical activity is associated with an improvement in health indices, especially it is an important life-style behavior to fight and prevent the alarming advance of childhood obesity. The report of the Commission to End Childhood Obesity of the World Health Assembly (WHO, 2016) established guidelines to reduce or end overweight and obesity in young children, noting that the number of infants and young children (0–5 years old) who have it increased from 32 million in 1990 to 41 in 2016. On the other hand, in countries with low-middle income, overweight and obesity in preschool children exceeds 30%; if these trends continue, young children and infants will remain obese throughout adolescence and adulthood, and by 2025 that population will increase to 70 million (Fernández-Revelles et al., 2020). In 2017, the 70th World Health Assembly confirmed it. In this sense, Torres-Luque et al. (2014) affirm that children in rural areas have better physical condition and play more, which Sagarna (2016) transports to children from cities when they play games at school, in the parks and at home. Thus, a possible positive or negative influence of the place of residence or environment in which the minors reside is detected, influencing their education.

In the rural environment, Levratto (2017) confirms through his research that children have a remarkable knowledge about digital reading. However, Cordero (2017) states that these children have a significantly lower state of mind and self-perception than those who live in cities.

The restriction situation has worsened these figures, since the children have not left their homes in two months and the subsequent exits have not allowed much movement due to the partial mobility restrictions imposed and/or recommended by the competent authorities of each Autonomous Community and/or country. Months after the restriction, many playgrounds remained closed, thus hindering children's motor play and free play, and offering the use of video games as a regular leisure alternative for children (Castañeda-Vázquez et al., 2019; Moreno-Arrebola et al., 2018; Ramírez-Granizo et al., 2018; Sánchez-Zafra et al., 2019).

For Sheldrick et al. (2019), the social environment of the home (human group that lives nearby and with approximately the same characteristics) has a notable influence on the behavior of children and their education. The physical environment is also decisive, understanding as a physical environment that linked to the architectural design of the house and that meets the needs and expectations of its inhabitants. Children usually carry out extracurricular physical activities (Martín-Espinosa et al., 2018), but they also spend 67% of their time at home sitting (Sheldrick et al., 2019). These latter authors indicate that an open plan living area (OPLA: open plan living area) and the perceived size of the house were positively associated with greater practice of physical activity. Furthermore, sitting breaks were positively associated with objective garden size and negatively associated with digital television. An OPLA was positively associated with full and moderate to vigorous physical activity. This work indicates the importance of the characteristics of the house in the behaviour of its inhabitants.

During the period of restriction, children do not go to class, they do not play active games and they move much less, but they maintain the energy of their ages that must be expended for the reasons given for the need for physical activity to avoid overweight and obesity. Outstanding 19th century physiologist Herbert Spencer pointed out in his theory of play that children play to channel their excess energy. Likewise, it is important to provoke the possible physical fatigue that compensates the visual and mental produced by the use of technological means, school tasks and stress caused by the change in their lives.

With the teachers acting online and the family directing the activities of the little ones, it is necessary to capture their attention and provoke

emotions to involve them in motor games that require more physical activity to help maintain their health (Fernández-Revelles et al., 2020). In this physical activity there are significant differences depending on whether or not material is used in motor play and whether it is active or calm, observing that they like those that require more movement and the use of an instrument, without differences of opinion between boys and girls (Salas-Sánchez et al., 2020). Situations that will probably be more present for those residing in rural areas and in the case of cities for those with larger households. Likewise, the child's emotions vary depending on the traits of the motor action, being the practices where the relationships determined by the internal logic of the cooperative game or in which the student plays alone the generators of positive emotions to a greater extent (Founaud and González-Audicana, 2020), so that the cooperation of siblings and parents or the games they can play individually, although directed by the elderly, may be beneficial for their emotional development.

Other educational activities that can be carried out during restriction, in addition to the physical ones, are artistic ones, such as painting, storytelling or setting up a theatre, playing an instrument and singing. In addition, children can play family board games, help with the order of the house in different tasks according to age and cook, all without forgetting schoolwork, reading and free play. However, the use of technological devices may have taken the longest time and be the most motivating activity for children up to 12 years of age, in which the type and location of the house can have a significant influence.

COVID-19 has altered life to such an extent that many people have become accustomed to the situation, making social distancing normal, at the risk of falling into problems of agoraphobia or cabin syndrome, thus addressing the philosophical thinking of an abstract society (Chmielewski, 2020). Sheltering at home has also been part of the situation that has become more complicated as the time of restriction has passed. In this sense, the current pandemic has come to reinforce the one that already existed and has been considered as such by the WHO, the physical inactivity that leads to sedentary lifestyle, overweight and childhood obesity (Hall et al., 2020).

Finally, the psychosocial aspects that surround the child's development are considered, such as the degree of happiness, energy or tiredness, self-esteem and creativity of the study subjects during restriction to observe if the place of residence, urban or rural as well as the type of housing will influence them.

Several studies (Barrera-Hernández et al., 2020; Nguyen and Gordon, 2019; Permiakova and Vindeker, 2019; Rodríguez-Ayllon et al., 2019) confirm that happiness in children depends on different factors, from values such as altruism, gratitude, equity or care of the environment, to psychological aspects or interaction with their parents. Some of these variables may have been affected by the period of restriction, such as going out to nature or the distance of loved ones, friends, grandparents, etc.

In the search for normality and for all children and families to re-adopt their pre-pandemic lifestyle, some authors point out that this pandemic will have lasting effects on behaviour patterns, especially of children (Hall et al., 2020).

For all the above, the main objective of this research was to determine and analyze whether the living conditions of children during the period of confinement caused by COVID-19 influenced their daily educational activities. Factors associated with living conditions are analyzed, such as the place of residence and the type of house in which Spanish children have been confined, as well as the number and use of technological devices.

Parents' perception of children's state of fatigue, happiness, energy and tiredness is also analyzed.

To meet these two objectives, data are collected related to children's sociodemographic factors, sex, size of the house, location of the place of

residence and activities carried out by the children in the home during the period of restriction.

## 2. Method

### 2.1. Study design and participants

A descriptive, comparative and cross-sectional quantitative study with a non-experimental design was carried out, with a single measurement in a single group. The questionnaire was carried out by a total of 837 Spanish families who had one or more children aged 0–12 years ( $M = 6.22$ ;  $DT = 3.36$ ), selected through convenience sampling, through a search for filters on social networks, using as labels families with children under 12 years of age and with residence in Spain. The questionnaire was operational for about two months of the restriction period. The distribution of the participants according to sex and the sociodemographic variables are shown in Table 1.

### 2.2. Variables and instruments

As a data collection instrument, the validated questionnaire on Equipment and Use of Information and Communication Technologies in Households (TIC-H2019) of the National Statistics Institute (INE) was used, following the recommendations of the Statistical Office of the European Union (EUROSTAT), in addition to the creation of an ad hoc self-registration questionnaire so that the parents of the children could download the data corresponding to the different variables under study.

The questionnaire called "Children and confinement" was developed by seven experts from the fields of general didactics, psychology, body expression and sport. After checking the incidents and the assessment of the questions, a 93% concordance rate was obtained. This was calculated by observing the experts' coincidences, dividing it by the total number of items and multiplying by 100. The questionnaire was created on the Google Forms platform and disseminated through social networks to reach the population under investigation, parents with children from 0 to 12 years of age, because children are not trained to give the necessary answers, especially the youngest ones. Likewise, the contacts of various education professionals who had access to a large number of families were used to ensure that the questionnaire was well disseminated in the different Autonomous Communities.

For this study, research focuses on the following variables:

#### 2.2.1. Sociodemographic

This variable analyzes the sex of the participants, categorized as a boy or a girl and the type of house in which they live during restriction, highlighting "flat below 60 m", "between 61-90 m", "between 91-120 m", "with more than 121 m", "house without garden" and "house with garden", as well as by the place of residence, urban, semi-urban or rural nucleus.

#### 2.2.2. Use of technological means

With this variable it is intended to know the use, counted in minutes a day, of technological means by boys and girls. The parents indicated the daily time that the study subjects spent in front of digital screens of game consoles, televisions, computers, tablets and mobile phones.

#### 2.2.3. Daily educational activities at home

This variable refers to the activities that can be carried out by children at home during the period of restriction. In the self-registration, the relatives indicated the daily time spent, in minutes, of physical activity, artistic activities, school and/or household

**Table 1.** Sample distribution according to sociodemographic aspects.

Gender	Frequency (n)	Percentage (%)
Boy	n = 420	50.2%
Girl	n = 417	49.8%
Type of House	Frequency (n)	Percentage (%)
61–90 m flat	n = 275	32.9%
91–120 m flat	n = 216	25.8%
House with garden	n = 209	25.0%
House without garden	n = 55	6.6%
Flat of more than 121 m	n = 47	5.6%
Flat below 60 m	n = 35	4.2%
Place of residence	Frequency (n)	Percentage (%)
Urban nucleus	n = 462	55.2%
Semi-urban or residential nucleus	n = 231	27.6%
Rural nucleus	n = 144	17.2%

Source: self-made

chores, playing instruments, playing with the family, reading and free play. Free play has been considered an educational activity because the game itself is a source of learning, thus influencing the education of a child.

**2.2.4. Psychosocial aspects**

This variable was recorded in order to know the degree of happiness, energy, tiredness, self-esteem and creativity of the study subjects during restriction.

**Table 2.** Use of technological devices depending on the type of house.

Variable	Type of house	M	SD	Error Std.	F	X <sup>2</sup>
Daily time of game console use	61–90 m flat	15.77	35.08	2.115	.562	.729
	91–120 m flat	20.23	41.75	2.841		
	Flat below 60 m	22.97	48.84	8.256		
	House with garden	18.85	49.47	3.422		
	Flat of more than 121 m	20.15	45.02	6.567		
	House without garden	24.05	50.10	6.756		
Daily time of television use	61–90 m flat	87.05	65.99	3.979	2.825	<b>.015<sup>a, b</sup></b>
	91–120 m flat	84.69	66.89	4.551		
	Flat below 60 m	69.23	45.32	7.661		
	House with garden	68.64	44.94	3.109		
	Flat of more than 121 m	74.77	68.99	10.064		
	House without garden	86.58	68.61	9.252		
Daily time of computer use	61–90 m flat	21.76	48.88	2.948	1.165	.325
	91–120 m flat	14.89	38.61	2.627		
	Flat below 60 m	13.40	34.31	5.800		
	House with garden	21.33	42.83	2.963		
	Flat of more than 121 m	11.11	23.75	3.465		
	House without garden	22.45	64.66	8.720		
Daily time of tablet use	61–90 m flat	29.06	52.73	3.180	.324	.899
	91–120 m flat	28.57	44.99	3.062		
	Flat below 60 m	21.26	34.27	5.794		
	House with garden	27.15	41.32	2.858		
	Flat of more than 121 m	30.85	39.16	5.713		
	House without garden	32.64	50.24	6.775		
Daily time of mobile phone use	61–90 m flat	12.71	33.46	2.018	1.123	.347
	91–120 m flat	13.10	38.68	2.632		
	Flat below 60 m	22.11	47.78	8.077		
	House with garden	13.81	36.40	2.518		
	Flat of more than 121 m	20.77	64.95	9.474		
	House without garden	22.62	51.21	6.905		

**Note 1.** Differences between 61-90 m flat and house with garden (a); Differences between house without garden and house with garden (b). Bold indicates a statistically significant relationship.

Source: self-made

For the self-records, a Likert-type scale was developed, with ten numerical response options with pre-established values from 1 to 10, where 1 is equivalent to "nothing or lower value" and 10 to "Much or higher value".

### 2.3. Procedure

The questionnaire was activated for 45 days, between March 23 and May 6, 2020, within the period of restriction established by the Government of Spain (RD 463/2020, of March 14). Of all the questionnaires received in the database, 76 were eliminated due to not being correctly completed or not belonging to the educational stage of study.

### 2.4. Ethical aspects

By completing the form, all participants gave their consent to work with the data anonymously. Throughout the research, the ethical principles reflected in different documents and official treaties on research ethics were taken into account, thus guaranteeing the anonymity of the participants, the confidentiality of the data reflected in the questionnaires and other ethical considerations related to educational research (American Psychological Association, APA, 2020; Paz Maldonado, 2018).

### 2.5. Analysis of data

A descriptive analysis was performed to determine the characteristics of the participants in which means (M), standard deviations (SD) and frequencies (%) were used. The Kolmogorov-Smirnov test ( $n > 30$ ) was used to establish the normality and homogeneity of the variance in the variables. The differences between the variables were formed with the ANOVA test, marking those between participants with the Pearson's Chi-square statistical indicator. The Bonferroni post-hoc test was performed for the analysis between sociodemographic and psychosocial variables. Statistical software SPSS 25.0 (IBM Corp, Armonk, NY, USA) was used to process and analyze the data.

## 3. Results

Table 2 shows the use of technological devices depending on the type of house during restriction. Statistically significant data were obtained for the daily time of television use ( $p = .015$ ). The children who use these

devices the most are those who live in apartments with 61–90 m ( $M = 87.05$ ;  $SD = 65.99$ ), followed by children with houses without garden ( $M = 86.58$ ;  $SD = 68.61$ ). Those who showed the lowest levels of use were those who lived at houses with garden ( $M = 68.64$ ;  $SD = 44.94$ ).

Table 3 shows how the place of residence influences the use of technological devices. The results are statistically significant for the time of daily use of TV, computers and tablets ( $p < .05$ ). Subjects whose place of residence is the urban nucleus showed the highest values of daily use of TV ( $M = 85.82$ ;  $SD = 68.04$ ), computers ( $M = 21.70$ ;  $SD = 50.50$ ) and tablets ( $M = 30.80$ ;  $SD = 49.02$ ).

Table 4 shows the daily activities carried out by children during restriction depending on the type of house. The time dedicated to physical activity stands out, where statistically significant results were found ( $p = .000$ ), being the subjects who live at a house with garden ( $M = 45.89$ ;  $SD = 42.01$ ) and on a flat with more than 121 m. ( $M = 37.98$ ;  $SD = 29.48$ ) those with the longest time. Regarding free play, there are also statistically significant differences in its application ( $p = .045$ ). In line with the above, children living at a house with garden ( $M = 118.11$ ;  $SD = 85.41$ ) showed the highest values, being those who live in flats less than 60 m. ( $M = 77.40$ ;  $SD = 59.12$ ) those who spend less time on physical activity.

Table 5 shows the children's daily educational activities according to their place of residence during restriction, for which statistically significant results were obtained ( $p < .05$ ). Study subjects whose place of residence is the rural nucleus show more time dedicated to physical activity ( $M = 41.59$ ;  $SD = 39.71$ ) and reading ( $M = 31.52$ ;  $SD = 22.14$ ) compared to urban and semi-urban nucleus. However, for time dedicated to free play ( $M = 116.73$ ;  $SD = 86.08$ ), differences were only observed with urban nucleus.

Table 6 establishes the relationships between the type of house and the psychosocial aspects of children during restriction. Regarding the degree of happiness ( $p = .028$ ) the study subjects living in flats of more than 121 m. ( $M = 8.55$ ;  $SD = 1.69$ ) and houses with garden ( $M = 8.32$ ;  $SD = 1.63$ ) showed the highest levels, being those that are on flats below 60 m. ( $M = 7.97$ ;  $SD = 1.72$ ) who present the lowest levels. On the other hand, for the degree of fatigue ( $p = .016$ ) the highest values are observed in the subjects who live in flats below 60 m. ( $M = 4.77$ ;  $SD = 2.46$ ). In the factors in which there are no statistically significant differences ( $p < .05$ ), children living in houses with garden score higher in self-esteem ( $M = 8.29$ ,  $SD = 1.72$ ) and creativity ( $M = 7.94$ ,  $DT = 1.84$ ), while those who live in a flat of more than 121 m. do it in energy grade ( $M = 8.53$ ,  $SD = 1.65$ ).

Table 3. Use of technological devices depending on the place of residence.

Variable	Place of residence	M	SD	Error Std.	F	X <sup>2</sup>
Daily time of game console use	Urban nucleus	20.63	43.92	2.043	1.144	.319
	Semi-urban nucleus	17.58	43.46	2.860		
	Rural nucleus	14.79	38.16	3.180		
Daily time of television use	Urban nucleus	85.82	68.04	3.166	4.760	<b>.009</b> <sup>a, c</sup>
	Semi-urban nucleus	70.72	49.49	3.257		
	Rural nucleus	78.40	55.33	4.612		
Daily time of computer use	Urban nucleus	21.70	50.50	2.350	2.932	<b>.014</b> <sup>a, c</sup>
	Semi-urban nucleus	15.81	35.53	2.338		
	Rural nucleus	15.32	36.10	3.009		
Daily time of tablet use	Urban nucleus	30.80	49.02	2.281	2.858	<b>.017</b> <sup>a, c</sup>
	Semi-urban nucleus	27.58	41.93	2.759		
	Rural nucleus	22.40	44.45	3.705		
Daily time of mobile phone use	Urban nucleus	14.63	41.46	1.929	1.548	.213
	Semi-urban nucleus	11.66	32.65	2.148		
	Rural nucleus	19.10	44.52	3.711		

Note 1. Differences between rural nucleus and urban nucleus (a); Differences between rural nucleus and semi-urban nucleus (b); Differences between urban nucleus and semi-urban nucleus (c).

Bold indicates a statistically significant relationship.

Source: self-made



Table 7 shows the psychosocial aspects of the children in relation to the place of residence during restriction, highlighting statistically significant differences ( $p < .05$ ). The highest values for the degree of happiness ( $M = 8.23$ ;  $SD = 1.51$ ) and self-esteem ( $M = 8.24$ ;  $SD = 1.54$ ) were registered in the subjects residing in semi-urban nuclei,

the lowest being for those in rural nuclei ( $M = 7.90$ ;  $SD = 1.74$  and  $M = 7.67$ ;  $SD = 1.87$ ). Furthermore, the energy level was higher for children whose place of residence is the urban nucleus ( $M = 8.50$ ;  $SD = 1.55$ ), with the lowest degree being those of the rural nucleus. ( $M = 8.22$ ;  $SD = 1.87$ ).

**Table 4.** Children's daily activities depending on the type of house.

Variable	Type of house	M	SD	Error Std.	F	X <sup>2</sup>
Time dedicated to Physical Activity	61–90 m flat	29.69	30.89	1.863	5.194	<b>.000</b> <sup>a, b</sup>
	91–120 m flat	36.61	35.95	2.446		
	Flat below 60 m	35.69	30.93	5.229		
	House with garden	45.89	42.01	2.906		
	Flat of more than 121 m	37.98	29.48	4.300		
	House without garden	33.29	27.41	3.697		
Time dedicated to School Homework	61–90 m flat	91.86	81.98	4.944	.883	.492
	91–120 m flat	95.02	81.34	5.535		
	Flat below 60 m	110.09	82.94	14.021		
	House with garden	93.81	76.29	5.277		
	Flat of more than 121 m	114.17	93.05	13.573		
	House without garden	98.82	73.97	9.975		
Time spent playing an instrument	61–90 m flat	8.08	24.66	1.487	1.069	.376
	91–120 m flat	7.43	15.72	1.070		
	Flat below 60 m	12.14	35.19	5.948		
	House with garden	5.83	13.33	0.922		
	Flat of more than 121 m	9.47	16.05	2.342		
	House without garden	4.64	12.16	1.640		
Time dedicated to Artistic Activities	61–90 m flat	58.091	53.04	3.198	1.314	.256
	91–120 m flat	50.787	47.42	3.226		
	Flat below 60 m	52.114	47.31	7.997		
	House with garden	49.526	44.94	3.109		
	Flat of more than 121 m	52.702	45.89	6.694		
	House without garden	43.491	46.86	6.319		
Time spent on Housework	61–90 m flat	21.731	24.19	1.459	1.221	.297
	91–120 m flat	19.426	18.35	1.249		
	Flat below 60 m	27.971	27.65	4.674		
	House with garden	20.800	20.39	1.410		
	Flat of more than 121 m	20.649	19.95	2.910		
	House without garden	18.145	20.01	2.698		
Time spent playing as a family	61–90 m flat	102.26	77.32	4.663	.995	.420
	91–120 m flat	98.60	84.17	5.728		
	Flat below 60 m	108.69	113.31	19.154		
	House with garden	105.94	83.17	5.753		
	Flat of more than 121 m	112.38	75.26	10.978		
	House without garden	82.67	60.60	8.171		
Time spent reading	61–90 m flat	27.018	19.95	1.203	.839	.522
	91–120 m flat	28.435	21.27	1.447		
	Flat below 60 m	25.571	21.74	3.676		
	House with garden	29.515	22.21	1.536		
	Flat of more than 121 m	28.213	17.82	2.600		
	House without garden	24.073	19.21	2.590		
Time dedicated to Free Play	61–90 m flat	106.92	84.13	5.073	2.284	<b>.045</b> <sup>c</sup>
	91–120 m flat	110.76	87.65	5.964		
	Flat below 60 m	77.40	59.12	9.994		
	House with garden	118.11	85.41	5.908		
	Flat of more than 121 m	96.30	69.43	10.128		
	House without garden	90.40	78.92	10.642		

**Note 1.** Differences between 61-90 m flat and house with garden (a); Differences between 61-90 m flat and flat of more than 121 m (b); Differences between flat below 60 m and house with garden (c).

Bold indicates a statistically significant relationship.

Source: self-made

**Table 5.** Children's daily activities depending on the place of residence.

Variable	Place of residence	M	SD	Error Std.	F	$\chi^2$
Time dedicated to Physical Activity	Urban nucleus	34.04	35.05	1.631	3.857	<b>.038</b> <sup>a, b</sup>
	Semi-urban nucleus	38.15	33.13	2.180		
	Rural nucleus	41.59	39.71	3.310		
Time dedicated to School Homework	Urban nucleus	97.97	83.87	3.902	1.013	.364
	Semi-urban nucleus	89.22	75.50	4.968		
	Rural nucleus	98.44	77.73	6.478		
Time spent playing an instrument	Urban nucleus	7.99	21.41	0.996	.622	.537
	Semi-urban nucleus	6.98	18.62	1.225		
	Rural nucleus	6.01	14.28	1.190		
Time dedicated to Artistic Activities	Urban nucleus	52.73	50.62	2.355	.024	.976
	Semi-urban nucleus	51.97	48.03	3.160		
	Rural nucleus	52.92	43.42	3.619		
Time spent on Housework	Urban nucleus	20.41	21.45	0.998	.243	.784
	Semi-urban nucleus	21.59	22.33	1.469		
	Rural nucleus	21.14	20.67	1.723		
Time spent playing as a family	Urban nucleus	105.64	86.70	4.034	1.744	.176
	Semi-urban nucleus	100.62	82.67	5.440		
	Rural nucleus	91.29	57.22	4.769		
Time spent reading	Urban nucleus	26.46	20.01	0.931	4.330	<b>.026</b> <sup>a, b</sup>
	Semi-urban nucleus	28.21	21.24	1.398		
	Rural nucleus	31.52	22.14	1.845		
Time dedicated to Free Play	Urban nucleus	105.57	86.20	4.010	2.977	<b>.047</b> <sup>a</sup>
	Semi-urban nucleus	116.60	71.05	5.921		
	Rural nucleus	106.73	86.08	5.664		

**Note 1.** Differences between rural nucleus and urban nucleus (a); Differences between rural nucleus and semi-urban nucleus (b); Differences between urban nucleus and semi-urban nucleus (c).

Bold indicates a statistically significant relationship.

Source: Self-made

#### 4. Discussion

The results, regarding the use of technological devices depending on the type of house, indicate that the children who make the most use of them are those who live in the smallest apartments or in houses without a garden. Those who use them the least are those who live in houses with gardens. Today's society is made up of a population in which connectivity through technologies is essential and, consequently, children and young people, born in the digital age, are highly digital experts.

The use that is given to technological devices at home is considered informal learning: to read or learn, practice or apply a specific activity or communicate and share, the latter more associated with leisure through social networks (Matamala, 2016). For these reasons it is important to make an analysis of the use that minors give to them, in which Formichella and Alderete (2018) coincide when they say that the use of technological devices at home has a positive impact on educational performance and analogously, the use of technological devices at school increases the use of such technologies at home.

The place of residence also influences the use of technological devices. Subjects whose place of residence is the urban nucleus watch TV more and use computers and tablets more. All this occurs because according to the INE (2019), Spanish households have all these devices (tablets, mobile phones, TVs, computers and game consoles) and have access to the internet and personal computer in a very high percentage, but above all they see the TV (many of them have one in each room). The benefits that technological devices can have in people's daily lives are relevant because they are an immense source of information and help communication between subjects (Garcés Jinés, 2012), highlighting their importance as services that help sustainable development, in any rural or urban environment; for this reason, they should not be forgotten in rural

areas where the complexity of their platforms makes their access and use difficult (Cusihamán et al., 2020).

When analysing the daily activities of children during restriction according to the type of house, it highlights that the time dedicated to physical activity of those who live at home with garden and in apartments with more than 121 m. is greater, along with free play. Children living on flats less than 60 m. proved to be the least time-consuming, probably due to lack of space. These results are in the same line as the results obtained by Pombo et al., (2020) in a study carried out with a sample of 2159 Portuguese children, confirming that children with an outdoor space and who had other children in the household were significantly more active ( $P < .001$ ); children from families with all adults working from home showed lower levels of %PA; and being younger, having a big outdoor space, having other children in the household, and having at least one adult free from working from home were significant positive predictors of children's %PA, explaining 21% of the overall variance.

A recent literature review (López-Bueno et al., 2021) on potential health-related behaviors for pre-school and school-aged children during COVID-19 lockdown also confirm socio-affective complications and insufficient physical activity in children, particularly among socio-economic deprived children. Other studies confirm a higher incidence of deterioration in people's mental health, especially affecting women with young children (Pierce et al., 2020). High percentages of symptoms related to boredom, feelings of loneliness and frustration were also registered in children (Kallitsoglou et al., 2020; de Figueiredo et al., 2021).

Another study (Pietrobelli et al., 2020) that analyzed the impact of confinement on the lifestyle of children with obesity confirms that when these children are unable to carry out daily school activities, they show

**Table 6.** Psychosocial aspects of children depending on the type of house.

Variable	Type of house	M	SD	Error Std.	F	X <sup>2</sup>
Degree of Happiness	61–90 m flat	8.09	1.46	.088	2.597	<b>.028</b> <sup>a, b</sup>
	91–120 m flat	8.08	1.45	.099		
	Flat below 60 m	7.97	1.72	.291		
	House with garden	8.32	1.63	.113		
	Flat of more than 121 m	8.55	1.69	.247		
	House without garden	7.95	1.66	.224		
Energy level	61–90 m flat	8.44	1.45	.087	.823	.533
	91–120 m flat	8.28	1.68	.114		
	Flat below 60 m	8.20	1.77	.301		
	House with garden	8.51	1.65	.114		
	Flat of more than 121 m	8.53	1.65	.241		
	House without garden	8.18	1.74	.235		
Degree of Fatigue	61–90 m flat	3.69	2.29	.138	2.815	<b>.016</b> <sup>a, b, c</sup>
	91–120 m flat	3.65	2.42	.165		
	Flat below 60 m	4.77	2.46	.416		
	House with garden	3.37	2.29	.159		
	Flat of more than 121 m	3.40	2.37	.346		
	House without garden	3.13	1.97	.266		
Degree of Self Esteem	61–90 m flat	8.03	1.52	.092	1.032	.397
	91–120 m flat	8.07	1.61	.110		
	Flat below 60 m	7.83	1.90	.321		
	House with garden	8.29	1.72	.119		
	Flat of more than 121 m	7.96	1.91	.279		
	House without garden	7.95	1.48	.200		
Degree of creativity	61–90 m flat	7.65	2.01	.122	1.189	.313
	91–120 m flat	7.59	1.86	.127		
	Flat below 60 m	7.37	1.97	.333		
	House with garden	7.94	1.84	.127		
	Flat of more than 121 m	7.83	1.79	.262		
	House without garden	7.51	2.14	.289		

**Note 1.** Differences between flat of more than 121 m and flat below 60 m (a); Differences between house with garden and flat below 60 m (b); Differences between house without garden and flat below 60 m (c).

Bold indicates a statistically significant relationship.

Source: Self-made

**Table 7.** Psychosocial aspects of children depending on the place of residence.

Variable	Place of residence	M	SD	Error Std.	F	X <sup>2</sup>
Degree of Happiness	Urban nucleus	8.20	1.49	.069	3.389	<b>.032</b> <sup>b</sup>
	Semi-urban nucleus	8.23	1.51	.099		
	Rural nucleus	7.90	1.74	.146		
Energy level	Urban nucleus	8.50	1.55	.072	3.348	<b>.036</b> <sup>a</sup>
	Semi-urban nucleus	8.29	1.52	.100		
	Rural nucleus	8.22	1.87	.156		
Degree of Fatigue	Urban nucleus	3.69	2.43	.113	1.123	.326
	Semi-urban nucleus	3.42	2.20	.145		
	Rural nucleus	3.54	2.17	.181		
Degree of Self Esteem	Urban nucleus	8.11	1.60	.075	3.628	<b>.027</b> <sup>b</sup>
	Semi-urban nucleus	8.24	1.54	.102		
	Rural nucleus	7.78	1.84	.153		
Degree of creativity	Urban nucleus	7.68	1.95	.091	.068	.934
	Semi-urban nucleus	7.74	1.92	.127		
	Rural nucleus	7.67	1.87	.156		

**Note 1.** Differences between rural nucleus and urban nucleus (a); Differences between rural nucleus and semi-urban nucleus (b); Differences between urban nucleus and semi-urban nucleus (c).

Bold indicates a statistically significant relationship.

Source: Self-made



unfavorable trends in their lifestyle behaviors, increasing the time in front of screens and sleep, and decreasing the level of physical activity.

The place of residence also influences the daily activities of the children during the restriction, being those who live in the rural nucleus those who spend more time on physical activity, followed by reading and free play. These results agree with [Torres-Luque et al. \(2014\)](#), who affirm that children in rural areas have a better physical condition than those who live in the city. Regarding free play, it focuses on games at school, in the parks and at home for children who live in cities ([Sagarna, 2016](#)), although now with restriction these children have seen their ability and freedom to play freely reduced.

It must be remembered that children usually carry out extracurricular physical activities ([Martín-Espinosa et al., 2018](#)); It is their natural state, children cannot be kept without moving, even if they are locked up and also the time they spend (67%) sitting must be compensated ([Sheldrick et al., 2019](#)). This study coincides with that of [Sheldrick et al. \(2019\)](#) when it indicates the importance of the characteristics of the house in the behavior of its inhabitants.

A higher level of reading appears in children living in rural settings. [Levratto \(2017\)](#) states that children living in rural areas have a greater knowledge of digital reading than schoolchildren in whose urban centers ICTs are not used in an integrated way. The time dedicated to school tasks does not vary according to the place where they live and the characteristics of the house, although the quality of these will probably depend on the preparation of the parents and the ease of access to the Internet between teachers and family.

Among the psychosocial aspects of children depending on the type of house, the degree of happiness of the study subjects who live in flats of more than 121 m. and in houses with gardens it is greater than those who live on the smallest flats. These values are inverted when talking about the degree of tiredness since the highest are found in subjects who live in flats below 60 m., which corresponds to the degree of energy, than in children who live in flats of more than 121 m. it presents higher values, while in subjects living in houses without a garden it is lower. An international study carried out in adults reveal a negative effect of home-confinement on mental and emotional wellbeing with more people developing depressive symptoms “during” compared to “before” the confinement period ([Ammar A. et al., 2020](#)).

The self-esteem and creativity of the participants who live in a house with garden is higher than that of the rest of the houses, while the subjects who live in flats less than 60 m. they score lower on these factors. It is possible that these results are caused by the stress of spending so much time in such small houses.

In relation to the place of residence, the highest values for the degree of happiness and self-esteem are observed in the subjects residing in semi-urban nuclei, the lowest for those in rural nuclei. In this sense, the results obtained by [Cordero \(2017\)](#) affirm that children who live in rural settings have a significantly lower state of mind and self-perception than those who live in cities. The degree of energy was higher for those who live in urban centres and lower for those in rural areas. Regarding the degree of fatigue, subjects who live in urban areas scored higher and those in semi-urban areas scored lower. Finally, the degree of creativity is higher in subjects residing in semi-urban centres, while the values are lower and similar in those who live in rural and urban areas.

## 5. Conclusions

It is concluded, at a descriptive and quantitative level, that the distribution of the daily time dedicated to the educational activities of children during the period of restriction can be grouped into three large blocks. A first block, with a greater number of minutes on average, dedicated to free play, family play and homework. A second block, with less average time, dedicated to practicing physical activity and artistic tasks. And a third block made up of activities that recorded the smallest values of dedication, which were reading books, participating in household chores and practicing playing a musical instrument. Meanwhile, and

without considering it as an educational task, the average times of use of electronic devices were the highest of all the activity blocks.

Regarding the correlational analysis, our results indicate children's educational activities, during the period of COVID-19 pandemic-related restrictions, were influenced by sociodemographic variables associated with type of house and place of residence.

It is concluded that the place of residence and the size of the dwelling were influential in the educational activities of the children during the period of restriction. Thus, children residing in houses with gardens reported less use of television. In turn, children who lived in apartments between 61-90 m<sup>2</sup> and in urban settings had a longer time of using technological devices such as television, computers and tablets.

Regarding the practice of physical activity and free play, the children who lived in houses with gardens and flats of more than 121 m<sup>2</sup> had higher levels of physical activity and longer times of free play. These levels were higher in children with rural residence compared to children with residence in urban or semi-urban areas. Higher reading times were also recorded in children with rural residence compared to children with urban residence.

The daily educational activities that have been carried out the most at home during restriction have been physical activities together with free play, followed by reading. Children who lived in apartments less than 60 m were those who spent the least time on physical activity. Regarding the time dedicated to school tasks, no significant variation was found based on the variables place of residence and type of dwelling.

Among the psychosocial and emotional aspects, it should be noted that the highest levels of perception of happiness indicated by parents based on the happiness of their children confirm that children residing in houses with gardens and apartments of more than 121 m<sup>2</sup> obtained the highest levels of happiness, while the lowest levels were found in children residing on flats below 60 m<sup>2</sup>. The latter also confirmed the highest levels of fatigue perception during the period of restriction.

The highest values for the degree of happiness and self-esteem are observed in the subjects residing in semi-urban nuclei, being the lowest for those in rural areas.

We conclude that in the sample of children under 12 years of age with whom we worked for this study, the place of residence and type of dwelling acted as a limiting factor, or as an opportunity, for the performance of numerous day-to-day educational activities of the kids.

## 6. Future perspectives

Given the possibility of experiencing in the future situations such as the one caused by COVID-19 through which children must be confined to their homes without being able to access the street or educational centres, it is advisable to establish educational and social policies that enhance the training of parents in relation to the multiple educational activities that can be promoted and carried out within the home, thus providing strategies to instill the practice of physical activity at home, reading, collaboration in domestic tasks that enhance the autonomy of children, the promotion of artistic activities and other educational activities that can be promoted at home and that offer a different leisure alternative to the use of electronic devices.

It is necessary to continue investigating this thematic line and to contrast the results presented in this work with the results of future investigations due to the limitations presented in the data collection instrument.

## Declarations

### Author contribution statement

Víctor Arufe-Giráldez, María Luisa Zagalaz-Sánchez, Javier Cachón-Zagalaz, Alberto Sanmiguel-Rodríguez, Gabriel González-Valero: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The data that has been used is confidential.

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The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

### References

- American Psychological Association, 2020. Publication Manual of the American Psychological Association (7th ed.). Washington, DC.
- Ammar, A., Mueller, P., Trabelsi, K., Chtourou, H., Boukhris, O., Masmoudi, L., et al., 2020. Psychological consequences of COVID-19 home confinement: the ECLB-COVID19 multicenter study. *PLoS One* 15 (11), e0240204.
- Barrera-Hernández, L.F., Sotelo-Castillo, M.A., Echeverría-Castro, S.B., Tapiá-Fonlle, C.O., 2020. Connectedness to nature: its impact on sustainable behaviors and happiness in children. *Front. Psychol.* 11.
- Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., Rubin, G.J., 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395, 912–920.
- Castañeda-Vázquez, C., Espejo-Garcés, T., Zurita-Ortega, F., Fernández-Revelles, A.B., 2019. Physical education's teacher training program through gaming, ict and continuous assessment. *Sport Tk-Revista Euroamericana de Ciencias del Deporte* 8 (2), 55–63.
- Chamarro-Lusar, A., Carbonell, X., Manresa, J.M., Muñoz-Miralles, R., Ortega-González, R., López-Morrón, M.R., Batalla-Martínez, C., Torán-Montserrat, P., 2014. El cuestionario de experiencias relacionadas con los videojuegos (CERV): un instrumento para detectar el uso problemático de videojuegos en adolescentes españoles. *Adicciones: Revista de Sociodrogalcohol* 26 (4), 303–311.
- Chmielewski, A., 2020. Abstract society in the time of plague. *Philos. Soc. Sci.* 50 (4), 366–380.
- Cordero, M.L., 2017. *Calidad de vida y estado nutricional: sus manifestaciones en escolares de ámbitos urbanos y rurales de Tucumán* (Tesis Doctoral). Universidad Nacional de Tucumán, Argentina.
- Cuesta-Cambra, U., Cuesta-Díaz, V., Martínez, L., Niño-González, J.I., 2020. Smartphone: en comunicación, algo más que una adicción. *Rev. Lat. Comunicación Soc. (RLCS)* 75, 367–381.
- Cusihamán, G.N., Alarcón, J.G., Ontiveros, W.R., 2020. Tecnologías de la información y comunicación, interculturalidad y desarrollo rural en la provincia de la unión. Arequipa Perú. *Publicaciones* 50 (2), 15–29.
- Government of Spain, 2020. Royal Decree 463/2020, of March 14, declaring the state of alarm for the management of the health crisis situation caused by COVID-19. BOE, Madrid.
- de Figueiredo, C.S., Sandre, P.C., Lima Portugal, L.C., Mazala-de-Oliveira, T., Chagas, L.d.S., Raony, I., Bomfim, P.O., 2021. COVID-19 pandemic impact on children and adolescents' mental health: biological, environmental, and social factors. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 106, 110171.
- Fernández-Revelles, A.B., Gil-Madrona, P., Domingo Lorente, L., 2020. Diferencias en el Tiempo de Actividad Física en Juegos Motores con y sin material. *J. Sport Health Res.* 12 (Supl 1), 53–72.
- Formichella, M.M., Alderete, M.V., 2018. TIC en la escuela y rendimiento educativo: el efecto medido del uso de las TIC en el hogar. *Cuadernos de Investigación Educativa* 9 (1), 75–93.
- Founaud, M.P., González-Audicana, C., 2020. La vivencia emocional en los estudiantes de Educación Primaria en Educación Física. *J. Sport Health Res.* 12 (Supl 1), 15–24.
- Garcés Jinés, J.E., 2012. *Los recursos tecnológicos y su incidencia en el proceso de enseñanza aprendizaje en las escuelas rurales de la unidad territorial educativa 05 zona 01 de la parroquia Pelileo del cantón san pedro de Pelileo provincia de Tungurahua durante el período escolar 2009-2010* (Maestría). Universidad Técnica de Ambato, Ecuador.
- Genevieve, F.D., Bridgette, D., Shirlene, D., 2020. Early effects of the COVID-19 pandemic on physical activity and sedentary behavior in children living in the U.S. *BMC Publ. Health* 20, 1351.
- Giallonardo, V., Sampogna, G., Del Vecchio, V., Luciano, M., Albert, U., Carmassi, C., Carrà, G., Cirulli, F., Dell'osso, B., Nanni, M.G., Pompili, M., Sanì, G., Tortorella, A., Volpe, U., Fiorillo, A., 2020. El impacto de la cuarentena y el distanciamiento físico después de COVID-19 en la salud mental: protocolo de estudio de un ensayo multicéntrico de población italiana. *Frontiers Psiquiatría* 11, 533.
- Guthold, R., Stevens, G.A., Riley, L.M., Bull, F.C., 2018. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. *The Lancet Global Health* 6 (10), e1077–e1086.
- Hall, G., Laddu, D.R., Phillips, S.A., Lavie, C.J., Arena, R.A., 2020. Tale of two pandemics: how will COVID-19 and global trends in physical inactivity and sedentary behavior affect one another? *Prog. Cardiovasc. Dis.* 50(33–0620) (20), 30077–30083 [published online ahead of print, 2020 Apr 8].
- Instituto Nacional de Estadística, 2019. Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los Hogares. INE.
- Kallitsoglou, A., Morgül, E., Essau, C.A., 2020. Psychological effects of the COVID-19 lockdown on children and families in the UK. *Revista De Psicología Clínica Con Niños Y Adolescentes* 7 (3), 42–48.
- Levrato, V., 2017. Arqueología: modalidades de lectura digital en niños y niñas de Educación Primaria. *Tendencias pedagógicas* 29, 101–120.
- López-Bueno, R., López-Sánchez, G.F., Casajús, J.A., Calatayud, J., Tully, M.A., Smith, L., 2021. Potential health-related behaviors for pre-school and school-aged children during COVID-19 lockdown: a narrative review. *Prev. Med.* 143.
- Martín-Espinosa, D., González-González de Mesa, C., Zagalaz-Sánchez, M.L., Chinchilla-Mira, J.J., 2018. Extracurricular physical activities: motivational climate, sportpersonship, disposition and context. A study with primary 6th grade students. *J. Human Sport Exercise* 13 (2), 466–686.
- Matamala, C., 2016. Uso de las TIC en el hogar: entre el entretenimiento y el aprendizaje informal. *Estud. Pedagog.* 42 (3), 293–311.
- Medrano, M., Cadenas-Sánchez, C., Osés, M., Arenaza, L., Amasene, M., Labayen, I., 2020. Changes in lifestyle behaviours during the COVID-19 confinement in Spanish children: a longitudinal analysis from the MUGI project. *Pediatric Obesity*. In press.
- Moreno-Arrebola, R., Fernández-Revelles, A.B., Linares-Manrique, M., Espejo-Garcés, T., 2018. Systematic review of habits of physical activity in university students. *Sport-Scientific Technical Jour of School Sport Physical Education and Psychomotricity* 4 (1), 162–183.
- Mulla, Z.D., Osland-Paton, V., Osland-Paton, V., Rodríguez, M.A., Vazquez, E., Kupesic Plavsic, S., 2020. Novel coronavirus, novel faculty development programs: rapid transition to eLearning during the pandemic. *J. Perinat. Med.* 48 (5), 446–449.
- Nguyen, S.P., Gordon, C.L., 2019. The relationship between gratitude and happiness in young children. *J. Happiness Stud.*
- Paz Maldonado, E., 2018. La tica en la investigacin educativa. *Revista Ciencias Pedaggicas e Innovacin* 6 (1), 45–51.
- Permiakova, M.E., Vindeker, O.S., 2019. Exploring the relationship between the happiness of preschoolers and their mothers. *Perspektivy Nauki i Obrazovania* 42 (6), 229–239.
- Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Abel, K.M., 2020. Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet. Psychiatry* 7 (10), 883–892.
- Pietrobelli, A., Pecoraro, L., Ferruzzi, A., Heo, M., Faith, M., Zoller, T., Antoniazzi, F., Piacentini, G., Fearnbach, S.N., Heymsfield, S.B., 2020. Effects of COVID-19 lockdown on lifestyle behaviors in children with obesity living in verona, Italy: a longitudinal study. *Obesity* 28 (8), 1382–1385.
- Pombo, A., Luz, C., Rodrigues, L.P., Ferreira, C., Cordovil, R., 2020. Correlates of children's physical activity during the COVID-19 confinement in Portugal. *Publ. Health* 189, 14–19.
- Ramrez-Granizo, I.A., Fernández-Revelles, A.B., Padiál-Ruz, R., Espejo-Garcés, T., García-Martínez, I., 2018. The level of physical activity and its relation to problematic use with video games. A narrative review. *J. Sport Health Res.* 10, 117–124.
- Reyes-Chua, E., Sibbaluca, B.G., Miranda, R.D., Palmario, G.B., Moreno, R.P., Solon, J.P.T., 2020. The status of the implementation of the e-learning classroom in selected higher education institutions in region IV - a amidst the covid-19 crisis. *J. Critic. Rev.* 7 (11), 253–258.
- Ricci, F., Izzicupo, P., Moscucci, F., Sciomer, S., Maffei, S., Di Baldassarre, A., Mattioli, A.V., Gallina, S., 2020. Recomendaciones para la inactividad física y el comportamiento sedentario durante la pandemia de la enfermedad por coronavirus (COVID-19). *Frontiers. Salud pública* 8, 199.
- Rodríguez-Ayllon, M., Cadenas-Sánchez, C., Estévez-López, F., Muñoz, N.E., Mora-Gonzalez, J., Migueles, J.H., Molina-García, P., Henriksen, H., Mena-Molina, A., Martínez-Vizcaíno, V., Catena, A., Löf, M., Erickson, K.I., Lubans, D.R., Ortega, F.B., Esteban-Cornejo, I., 2019. Role of physical activity and sedentary behavior in the mental health of preschoolers, children and adolescents: a systematic review and meta-analysis. *Sports Med.* 49 (9), 1383–1410.
- Sagarna, A., 2016. *Del hogar a la ciudad: transiciones adaptadas a la infancia* (Tesis Doctoral). Universidad del País Vasco, España.
- Salas-Sánchez, M.I., Muntaner-Mas, A., Vidal-Conti, J., 2020. Intervención educativa en el tiempo de patio en un centro escolar para mejorar aspectos relacionados con la salud y el bienestar de los alumnos. *J. Sport Health Res.* 12 (Supl 2), 127–136.
- Sánchez-Zafra, M., Ramírez-Granizo, I.A., Báez-Mirón, F., Moreno-Arrebola, R., Fernández-Revelles, A.B., 2019. Analysis of the relationship between the use of video games and the practice of physical activity. *Sport-Scientific Technical J. School Sport Phys. Edu. Psychomotricity* 5 (1), 118–132.
- Sheldrick, M.P., Maitland, C., Mackintosh, K.A., Rosenberg, M., Grihs, L.J., Fry, R., Stratton, G., 2019. Associations between the home physical environment and children's home-based physical activity and sitting. *Int. J. Environ. Res. Publ. Health* 16, 4178.
- Torres-Luque, G., Molero, D., Lara-Sánchez, A., Latorre-Román, P., Cachón-Zagalaz, J., Zagalaz-Sánchez, M.L., 2014. Influencia del entorno donde se habita (rural vs urbano) sobre la condición física de estudiantes de educación primaria. *Apunts. Medicina de l'esport* 49 (194), 105–111.

Tulaev, B., Daminov, O., Khakimov, J., Turdiev, J., 2020. Developing competencies in the development of information and Communication technologies. *J. Critic. Rev.* 7 (2), 296–298.

World Health Assembly, 2016. Informe de la comisión para acabar con la obesidad infantil. OMS.

World Health Organization, 2019. Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. OMS.