Original Article

Sleep, physical activity and screens in 0-4 years Spanish children during the COVID-19 pandemic: Were the WHO recommendations met?

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ABSTRACT

The World Health Organization (WHO) has warned in recent years about child physical inactivity. The pandemic caused by COVID-19 meant in many countries the establishment of a period of confinement with the deprivation of movement of children. The aim of this paper is to analyse whether, during the period of confinement, the WHO recommendations regarding sleep, physical activity and the use of technological devices in children under 5 years of age resident in Spain were met. The sample was composed of 280 Spanish children. The results confirm high values in the use of screens, especially television (M = 65.33), followed by tablets (M = 17.10) and mobile phones (M = 8.34). Physical activity levels were detected to be lower than recommended, with an average of 31.81 minutes versus the recommended 180 minutes. As for sleep hours, the recommendations were minimally fulfilled (M = 10.73; SD = 1.72). It is concluded that the period of confinement may have been an obstacle to complying with WHO recommendations regarding the practice of physical activity and screens in children under 5 years of age, which may have further aggravated the health of children in relation to pathologies associated with sedentary life.

Keywords: WHO; Children; Sleep; Physical activity; Screens.

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INTRODUCTION

The World Health Organization (WHO) has come to consider obesity as "*the epidemic of the 21st century*", due to the scope it has reached and its impact on morbidity, quality of life and health expenditure. According to the WHO (2019), Spain is one of the EU countries with the highest prevalence of overweight and obesity: it affects 56% of adults and around 40% of children and adolescents. For all these reasons, the WHO (2019) established guidelines with minutes of sleep, physical activity (PA) and use of screens during early childhood (Table 1). On the other hand, Guan et al. (2020) recommend that preschool-age children (3-4 years old) accumulate at least 180 minutes of PA, participate in no more than 1 hour of sedentary screen time, and sleep 10 to 13 hours per day. Children typically perform daily PA through active school trips, physical education, recesses, organized sports, active games, dancing, and spending time in outdoor parks. As a result of the 2019 coronavirus pandemic (COVID-19), opportunities for children to meet the movement's behavioural guidelines have been affected by school closings and physical distancing measures implemented by many governments (Guan et al., 2020). According to this latest study, children's health will be further compromised during COVID-19.

Table 1. Summary of the 2019 WHO recommendations.

Population	Sleep recommendations	PA recommendations	Screen recommendations
Up to 1 year old	Up to one year indicated a minimum of 12 hours of sleep	The time spent on daily PA was not specified but indicates the following: - Allow the child time for interactive play on the floor. - Allow him to lie on his stomach several times a day for periods of 30 minutes. - Do not remain static or subject to highchairs, strollers, etc. for more than 1 hour straight.	Screens time 0
From 1 to 2 years	A minimum of 11 hours of sleep is recommended	Perform at least 180 minutes of PA per day	Maximum of 1 hour with screens
From 3 to 4 years	A minimum of 10 hours of sleep is recommended	Perform at least 180 minutes of PA per day	Maximum of 1 hour with screens

Sleep and rest in early childhood

Sleep is crucial for children's health and development. Reduced PA and increased screen time negatively affect sleep in older children, but little is known about these associations in children younger than 5 years (Janssen et al., 2020; Leppänen et al., 2019; Parsons, Ollberding, Smith & Copeland, 2018). Childhood is a critical period of growth in which multiple habits are established that will last into adulthood. Because healthy habits have been positively associated with physical and cognitive health in children, there is a need to encourage their promotion from an early age (Adelantado-Renau, Gordo & Sánchez, 2019; Iwata, Iwata, Iemura, Iwasaki & Matsuishi, 2011). Early Childhood Education is the first educational stage in school life but its meaning goes beyond the mere formative reference to the child's early years (de Moya Martínez & Vivar, 2015). Thus, we can say that it is based on the attainment of basic and fundamental competences that remain throughout all educational training (de Moya Martínez & Vivar, 2015).

Learning to sleep in childhood has relevant repercussions on the child's comprehensive development. (Montserrat & Fortes, 2013). Sleeping correctly and safely allows the baby to regulate the circadian rhythm that he will maintain throughout his life, a key factor for the child to grow physically and cognitively (Zamora, Pin & Dueñas, 2014). It has been shown that when there is a chronic sleep deficit, children noticeably increase the level of anxiety, aggressiveness, poor performance and memory. Sleep disorders have also been shown to severely affect the endocrine system, which can lead to eating disorders and also lead to childhood obesity, sleep apnoea, and hyperactivity (Zamora et al. 2014). Following these contributions, Li, Zhang, Huang and Chen (2017) and Tremblay et al. (2017) noted that shorter sleep duration was associated with higher adiposity, poorer emotional regulation, impaired growth, more time in front of the screen and a higher risk of injury.

Thus, life habits determine the well-being of children and inadequate management can produce an imbalance in the state of health (Martil, Calderón, Carmona & Brito, 2019). The family environment is one of the most relevant socialization contexts in the field of health during early childhood. Although infant morbidity and mortality patterns and influencing factors have varied, parental influence continues to be essential for the acquisition and maintenance of healthy habits (Ballester et al., 2012). According to Insuga et al. (2013), chronic sleep deprivation in children is associated with an increased risk of developing overweight-obesity and / or metabolic syndrome (high blood pressure, increased insulin resistance and dyslipidaemia). For Giménez et al. (2016), children with sleep phase disorders sleep few hours during the week, generating chronic sleep deprivation that will manifest with daytime sleepiness, fatigue, inattention, impaired school performance, or truancy. Characteristically, on the weekend or during the holidays, when they are free of schedules, they delay sleep, this being of normal characteristics and getting up rested.

Physical activity during early childhood

FA constitutes one of the fundamental pillars for the correct physical and psychological development of the child, since it is considered an essential means for the prevention of pathologies and improvement of health, as well as in the fight against childhood obesity (Aranceta, 2013; Castillo et al. 2012; Díaz Martínez, Mena Bastías, Celis-Morales, Salas & Valdivia Moral, 2015; Duque & Parra, 2012; Jurado, Llorente & Gil, 2019; Kunzle-Elizeche, González-Fernández & Radice-Oviedo, 2018; Moral & López, 2011; Park, Park, Bahorski & Cormier, 2019; Pérez Solís et al., 2015; Torres-Luque, Beltrán, Calahorro, López-Fernández & Nikolaidis, 2016), since it increases the risk of chronic medical conditions such as type 2 diabetes, metabolic syndrome and hypertension (Ullmann et al., 2018). Early childhood should be seen as a critical time to promote healthy behaviours related to energy balance and PA (Saldanha-Gomes et al., 2017) and impact multiple health and development outcomes, including psychosocial well-being (Hinkley, Brown, Carson & Teychenne, 2018). For these authors (Hinkley et al., 2018), social skills, a component of psychosocial well-being, are vital for children's school readiness and future mental health. For Poskitt (2014) the prevalence of overweight / obesity varies according to the environments in which children live. Another study (Okely, Tremblay, Reilly, Draper & Bull, 2018) estimated that at least 41 million children under the age of 5 worldwide were overweight or obese in 2016, and this number is likely to increase to at least 50 million by 2030.

Although the prevalence of overweight or obesity among children under 5 years of age has stagnated in some developed countries, rates have increased among children in low- and middle-income countries in the past 15 years.

Regular PA promotes and prevents various non-communicable diseases, among which we can mention obesity, sleep disturbance and osteoporosis, in addition to improving mental health (Kunzle-Elizeche et al., 2018). For López, Pinillos and Román (2017) preschool children have low levels of PA, below international

recommendations, which affects their physical condition and their current health, and predictably in their adolescence and adult stages. The school is an essential space for promoting PA and improving physical condition and health (López et al., 2017). Light and moderate intensity PA was not consistently associated with any health indicator, while moderate to vigorous intensity, vigorous intensity, and total PA were associated with multiple health indicators in Canadian preschool children (Tremblay et al., 2017).

The prevalence of overweight and obesity in the school population has been increasing in recent years, and its control is vital given the relationship between obesity and morbidity and mortality from cardiovascular and other causes (Moreno, Albero, Martínez & López, 2020). Obesity and metabolic syndrome are two of the great children's health problems in western society (Insuga et al., 2013). For Ajejas et al. (2018), Duffine Gilman and Volpe (2018), Kondolot et al. (2017) y Sasaki, Yorifuji, Iwase, Komatsu and Takao (2010) Childhood obesity is a public health concern that threatens the health and well-being of children globally and is related to several chronic health conditions in that group. Food consumption and PA contribute greatly to the energy balance of children. Mental health is also related to weight status and PA (Duffine Gilman & Volpe, 2018). The trend in the prevalence of obesity and childhood overweight in Spain has increased continuously in the last three decades. Currently, obesity and overweight affect 15 and 20% of Spanish children, respectively, and these percentages are among the highest in Europe (Franco, Sanz, Otero, Domínguez-Vila & Caballero, 2010).

PA practice at school is very important for children from low-income households located in disadvantaged areas. These children cannot access PA after-school programs due to the lack of adequate offers in the area, security problems, or lack of financial resources (Arias, 2014). Girls whose mothers were poorly educated were more likely to be in this high-risk group. Girls who had the longest television viewing time and least favourable eating habits from 2 to 5 years old had the highest body fat at 5 years (Saldanha-Gomes et al, 2020). Following these same contributions, Armstrong, Covington, Hager and Black (2019) indicated that poverty is a risk for short sleep and limited PA.

Mallol (2019) showed that children's right to play is recognized in article 31 of the 1989 Convention on the Rights of the Child. The aforementioned precept 31 recognizes other rights, such as the right to rest, leisure and recreational activities such as play, as it is considered an indispensable component of the physical, social, cognitive, emotional and spiritual development of minors (Mallol, 2019). Playing is an essential necessity for every child and the tool that will allow him to know himself and the world he belongs to. Psychomotricity proposes a different model of approaching the child from respect for his needs, his way of being and expressing himself (Arráez & Quirós, 2006). Following these contributions, other researchers (Arufe, 2020; Garófano, Caveda & Caveda, 2002; Teixeira, Abelairas, Arufe, Pazos & Barcala, 2015; Teixeira, Barcala, Abelairas & Arufe, 2015) justify the importance of play for the comprehensive development of children in the Early Childhood Education stage. For Kim and Kim (2009), outdoor play supports children's physical, cognitive, social and language development. Following these lines, Saldanha-Gomes et al. (2017) indicated that outdoor play was inversely associated with less body fat percentage.

Children's playtime is decreasing dangerously due to multiple factors, including: immersion in electronic media, parents' long workdays to support their families, increased content learning from preschool, and increased focus on structured academic activities (Monge, Méndez, Hernández, Quintana & Presa, 2019). For Carrión (2020) games are very useful in the educational environment, they function as creative teaching strategies and constitute a peculiar way of interaction of the child with his environment. Play is a vital necessity, contributes to human balance, and is at the same time activity, adventure and experience: a means of communication and liberation in a permitted form, play is a process of complete education, indispensable

for the child physical, intellectual and social development (Carrión, 2020). Play promotes healthy living habits and can be a support for parents (Echenique & Pèlach, 2002). According to Pinargote, Pinargote, Alcivar and Rojas (2019), play games are the most used for the development of motor skills and their effect on visual-motor coordination, motor coordination (coarse and fine) and social interaction of boys and girls is recognized. For Monge et al. (2019) games include an improvement in executive functioning, in language, in early mathematical skills (handling of numbers and spatial concepts), in social development, in relationships with peers, in physical development and in health, including emotional health, probably because it dampens anxiety and stress. For Andreu (2009) traditional children's games are the maximum exponent within the recreational culture of a people and, sometimes, derive from ceremonies proper to adults, although they belong in their spirit to the world of boys and girls. In Mediterranean countries, the climate favoured outdoor play and such circumstance led to being able to do without toys for fun (Andreu, 2009).

On the other hand, the results of other research (Pastor-Vicedo, Martínez-Martínez, Tévar & Prieto-Ayuso, 2019) reflected the importance of PA in academic performance, as well as the transversal benefits it brings to health. For Muñoz-Galiano, Hernández-García and Torres-Luque (2019) there are no differences in terms of the volume of PA according to educational level, but there is a tendency to be higher, when the parents' educational level is higher, fundamentally in the volume of PA developed over the weekend. If both parents have the same or different educational levels, it does not affect the volume of PA practice. It is considered necessary to continue deepening the influence that the family can have on healthy aspects such as the practice of PA (Muñoz-Galiano et al., 2019).

Another investigation (Delgado-Lobete & Montes-Montes, 2015) analysed the preferences for extracurricular activities in preschool children. Thus, the boys practiced soccer and swimming while the girls participated more in dance activities. The results obtained in this study (Delgado-Lobete & Montes-Montes, 2015) confirm the need to improve physical-sports activity programs from an early age, especially in immigrant children, whose occupational participation may be limited.

Screens and device use in early childhood

On-screen display is a means of entertainment and sedentary behaviour that impacts metabolic processes, interferes with sleep and PA (Chen et al., 2020; Kaur, Gupta, Malhi & Grover, 2019; Yoong et al., 2019). The current media ecosystem and the omnipresence of screens have become a leading element in hyperconnected society (Castro, Caldeiro-Pedreira & Rodríquez-Rosell, 2018). Every time at younger ages, minors, called digital natives, are in contact with technology (Castro et al., 2018).

For Pons, de Anta and Ferrer (2005), the media and new technologies have an increasing influence on children, the most defenceless in front of the screens. The development of New Information and Communication Technologies together with the introduction of the Internet have fostered new forms of communication and interaction with children; television, the undisputed audience leader, is being displaced by new forms of leisure, entertainment and fun through the network (Moreno & Rosell, 2010). According to this research (Moreno & Rosell, 2010), children's digital television channels have found a way to communicate with children through the Internet and have developed the web pages of their respective channels as a complementary resource to television broadcasts. For Martín (2016), with the emergence and development of the Internet, technology has become the protagonist of developed societies, presenting a panorama in which the educational and technological planes intersect. In the scenario of the new screens, tablets have been firmly implanted in the daily life of the little ones as an easy-to-use tool.

The new generations live exposed daily to stimuli from electronic devices and various leisure instruments that are associated in maintaining sedentary behaviour. (García-Soidán, Boente & Leirós-Rodríguez, 2020). Sedentary lifestyle associated with new technologies is one of the main factors related to childhood obesity (Chacón Cuberos et al., 2015). New Technologies, and especially video games, are part of children's daily life (Sánchez-Zafra, Ramírez-Granizo, Baez-Mirón, Moreno-Arrebola & Fernández-Revelles, 2019). For these authors (Sánchez-Zafra et al., 2019), the practice of PA reduces the number of students with problems related to video games.

The total time children spend watching television is sometimes so high that they have little time left for another activity. It is television more than any other medium that provides a common base of information in the early stages of the child's socialization. (Sedeño, 2005). The presence of television and other electronic media focus children's daily lives, and the number of hours spent in front of the screen tends to increase with time, with age and if they have a television in their room (Sánchez, 2012). Many of the television programs aimed at children under three years of age indicate that they pursue educational purposes but it has not been clearly established that they can accomplish these purposes (Sánchez, 2012).

On the other hand, video games have become one of the main entertainment vehicles for children (Feijoo & García-González, 2016). Along these lines, the results obtained by Serrano (2017) show an association of the practice of the Nintendo Wii with an improvement in cognition and an increase in the level of PA. In conclusion, the use of new technologies is suggested, especially using them in an integral way through educational games that implicitly involve movement, to continue instilling healthy PA habits, increasing student motivation, reducing daily sedentary time spent in classrooms, promote better socialization, and consequently, improve school performance.

For all these reasons, the objective of this work has been to analyse the number of hours of sleep, PA, and screen use time of children aged 0 to 4 years. The aim is to find out whether, during the state of alarm decreed in March 2020 by the Government of Spain, children in this age group have complied with the recommendations indicated by the WHO regarding hours of rest, PA and use of devices despite being confined in their homes.

METHODS

Study design and participants

A quantitative study was conducted with a non-experimental (ex post facto) design of a descriptive, comparative, correlational and cross-sectional type, with a single measurement in a single group. The sample was composed of 280 Spanish children, aged 0-4 years (M = 2.44; D.T.= 1.294). Specifically, 9.3% (n = 26) were younger than one year, 40.4% (n = 113) between 1-2 years and 50.4% (n = 140) between 3-4 years. The distribution of the sample according to the sex of the participants was homogeneous, with 51.1% (n = 143) for boys and 48.4% (n = 137) for girls. The sampling used was for convenience, inviting those families with children under five years of age to participate during confinement.

Variables and instruments

In accordance with the new guidelines proposed by the World Health Organization (WHO, 2019) on PA, sedentary lifestyles and sleep in children under five, the following variables and instruments were used.

Through an Ad-Hoc questionnaire (self-registration sheet), sociodemographic aspects such as gender, age of participants and the stage categorized into infants (under one year old), children from 1 to 2 years old and children from 3 to 4 years old were recorded.

In this line, for the resources and use of technological means, the number of televisions, video consoles, computers and tablets available in the home were recorded, through a validated questionnaire on Equipment and Use of Information and Communication Technologies in Households (ICT-H2019) prepared by the National Statistics Institute (NSI), following the recommendations of the European Union Statistical Office (EUROSTAT). In this way, the daily time (expressed in minutes) spent by children in front of the digital screens of video consoles, televisions, computers, tablets and mobile phones was indicated. With regard to the psychosocial aspects, a Likert-type scale was used with a range of 0-10 on which the degree of happiness, energy, tiredness, self-esteem and creativity were assessed.

Procedure

The questionnaire was disseminated through social networks and using as a filter families with residence in Spain and children under 5 years old, in addition contacts were established with various education professionals who were close to a wide audience of families to ensure a good dissemination of the questionnaire in the different Autonomous Communities of Spain. The questionnaire was disseminated during 45 days, between March 23rd and May 6th 2020, within the period of confinement established by the Spanish Government Royal Decree 463/2020, of March 14th (Government of Spain, 2020).

A total of 29 questionnaires were eliminated because they were not correctly completed or did not belong to the educational stage of study.

Ethical aspects

Throughout the research, the ethical principles reflected in different official documents and 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 research in education (American Psychological Association, 2020; Sañudo, 2006).

Data analysis

SPSS 25.0 (IBM Corp, Armonk, NY, USA) was used for the processing and analysis of the data obtained. In the descriptive analysis of the study, the characteristics of the participants were determined by the mean (M), the standard deviation (SD) and the frequencies (%). The normality and homogeneity of the variance in the variables was stipulated with the Kolmogorov-Smirnov test. The ANOVA test was used to establish the differences between variables. Differences between participants were determined with the Pearson Chi-square test. Likewise, a bivariate correlation of Pearson was performed at the significance level of $p < .05$* and $p < .01$**. These were interpreted as weak ($r < .29$), moderate ($r = .3$-$.49$) and strong ($r = .5$-1) correlations.

RESULTS

Table 2 shows the basic descriptions of technological aspects during confinement of children under five years of age. These results showed that the devices that have the greatest presence in the home are televisions ($M = 1.82$; $SD = 0.967$) and computers ($M = 1.68$; $SD = 0.926$). Regarding the daily time spent by children in front of the screens, the highest values were found for television ($M = 65.33$; $SD = 61.09$), followed by the use of tablets ($M = 17.10$; $SD = 36.99$) and mobile phones ($M = 8.34$; $SD = 28.28$).

Table 3 shows the basic descriptions of the health and psychosocial aspects of children under five years of age during confinement. Within the healthy aspects, PA levels were detected to be below the recommended level (M = 31.81; SD = 42.20), as is the case with sleeping hours (M = 10.73; SD = 1.72). With respect to the psychosocial aspects, the highest values were detected in the degree of energy (M = 8.83; SD = 1.40), happiness (M = 8.48; SD = 1.51) and self-esteem (M = 8.39; SD = 1.61).

Table 4 shows the technological aspects according to the stage of children under five years of age during confinement. Statistically significant results were obtained ($p \leq .05$). Regarding the number of computers in the home, families with children between 1-2 years of age, showed the highest number of devices (M = 1.84; SD = 1.03). As for the time of use of devices, the subjects included in the ages of 3-4 years old were those who obtained the highest levels of use of television (M = 89.14; SD = 59.43), tablets (M = 23.13; SD = 44.00) and video consoles (M = 6.29; SD = 27.36). According to WHO recommendations (2019), children under five years of age showed a higher use of screens than recommended.

Table 5 shows the health and psychosocial aspects by stage of children under five years of age during confinement, for which statistically significant results were obtained ($p \leq .05$). As for the healthy aspects, the highest average values were obtained in the 1-2 year stage of PA practice (M = 35.58; SD = 49.29), highlighting that the minimum values are not reached in any of the stages, according to WHO recommendations (2019). As for sleep hours, the highest levels were found in children under one year of age (M = 11.69; SD = 1.87). However, according to WHO recommendations (2019), subjects meet the minimum criteria slightly (in children under one year 12-16 hours are recommended, in children 1-2 years 11-14 hours are recommended and in children 3-4 years 10-13 years). Regarding the psychosocial aspects, the degree of tiredness was lower in children of 1-2 years old (M = 3.82; SD = 2.62), while the degree of creativity was higher in children of 3-4 years old (M = 8.09; SD = 1.43).

Table 6 shows the correlations between variables in children under five years of age during confinement. PA practice was directly associated with time in front of the television (r = .168**), computers (r = .150*) degree of fatigue (r = .217**) and creativity (r = .128*). However, daily sleeping hours were indirectly related to time in front of video consoles (r = -.173**), television (r = -.308**) and tablets (r = -.231**). The degree of happiness was negatively correlated with the use of television (r = -.143*) and computers (r = -.141*). Thus, the degree of tiredness was positively correlated with the use of computers (r = .164**). Finally, the degree of self-esteem was directly associated with happiness (r = .690**) and energy (r = .535**), and indirectly with the degree of fatigue (r = -.160**).

Table 2. Basic descriptions of technological aspects during confinement.

Variables	Minimum	Maximum	Mean	SD
TVs at home	0	6	1.82	0.96
Video consoles at home	0	12	0.58	1.06
Computers at home	0	7	1.68	0.92
Tablets at Home	0	7	1.14	0.92
Daily use of Videogame consoles	0	250	3.38	19.93
Daily TV use	0	360	65.33	61.09
Daily Computer Use	0	300	3.83	24.83
Daily use of Tablets	0	300	17.10	36.99
Daily Mobile Phone Use	0	330	8.34	28.28

Table 3. Basic descriptors on health and psychosocial aspects during confinement.

Variables	Minimum	Maximum	Mean	SD
Minutes Physical Activity	0	300	31.81	42.20
Sleeping hours	6.0	14.0	10.73	1.72
Happiness level	1	10	8.48	1.51
Energy level	1	10	8.83	1.40
Fatigue level	1	10	3.51	2.43
Self-esteem level	1	10	8.39	1.61
Creativity level	1	10	7.71	2.00

Table 4. Technological variables as a function of stage during confinement.

Variable	Stage	M	SD	Error Std.	F	X^2
TVs at home	≤ 1 year	2.04	1.11	0.21	2.752	0.066
	1-2 years	1.66	0.94	0.08		
	3-4 years	1.91	0.94	0.08		
Video consoles at home	≤ 1 years	0.69	0.78	0.15	1.262	0.285
	1-2 years	0.67	1.28	0.12		
	3-4 years	0.48	0.89	0.07		
Computers at home	≤ 1 years	1.65	0.56	0.11	3.231	0.041
	1-2 years	1.84	1.03	0.09		
	3-4 years	1.55	0.87	0.07		
Tablets at home	≤ 1 years	1.15	0.73	0.14	0.017	0.983
	1-2 years	1.12	1.11	0.10		
	3-4 years	1.14	0.78	0.06		
Daily time of use of video consoles	≤ 1 years	0.00	0.00	0.00	3.077	0.048
	1-2 years	0.53	5.64	0.53		
	3-4 years	6.29	27.36	2.30		
Daily television usage time	≤ 1 year	5.00	16.31	3.19	33.517	0.000
	1-2 years	49.50	54.87	5.16		
	3-4 years	89.14	59.43	5.00		
Daily computer usage time	≤ 1 year	0.00	0.00	0.00	0.362	0.697
	1-2 years	3.86	28.61	2.69		
	3-4 years	4.52	23.89	2.01		
Daily Tablet usage Time	≤ 1 year	1.15	5.88	1.15	5.039	0.007
	1-2 years	13.26	29.33	2.75		
	3-4 years	23.13	44.00	3.70		
Daily mobile phone usage time	≤ 1 year	3.46	12.94	2.53	0.479	0.620
	1-2 years	9.50	37.85	3.56		
	3-4 years	8.30	20.31	1.71		

Table 5. Healthy and psychosocial variables according to stage during confinement.

Variable	Stage	M	SD	Error Std.	F	X^2
Physical Activity Minutes	≤ 1 year	6.54	16.95	3.32	5.382	0.005
	1-2 years	35.58	49.29	4.63		
	3-4 years	33.45	37.71	3.17		
Sleeping hours	≤ 1 year	11.69	1.87	0.36	26.046	0.000
	1-2 years	11.35	1.74	0.16		
	3-4 years	10.05	1.39	0.11		
Happiness level	≤ 1 year	8.62	2.45	0.48	0.309	0.734
	1-2 years	8.53	1.54	0.14		
	3-4 years	8.41	1.27	0.10		
Energy level	≤ 1 year	8.54	2.51	0.49	0.614	0.542
	1-2 years	8.85	1.30	0.12		
	3-4 years	8.87	1.19	0.10		
Fatigue level	≤ 1 year	2.46	2.17	0.42	3.444	0.033
	1-2 years	3.82	2.62	0.24		
	3-4 years	3.46	2.26	0.19		
Self-esteem level	≤ 1 year	8.00	2.66	0.52	0.855	0.427
	1-2 years	8.45	1.54	0.14		
	3-4 years	8.41	1.39	0.11		
Creativity level	≤ 1 year	5.65	3.26	0.64	18.308	0.000
	1-2 years	7.70	1.96	0.18		
	3-4 years	8.09	1.43	0.12		

Table 6. Correlation between study variables in children under five years of age during confinement.

	HSD	UDVC	UDTV	UDPC	UDTB	UDTM	GF	GE	GCA	GA	GCR
TDAF	-.098	.115	.168**	.150*	.083	.089	-.020	.044	.217**	-.019	.128*
HSD	1	-.173**	-.308**	-.055	-.231**	-.113	.109	-.026	.014	.075	-.039
UDVC		1	.179**	.090	.217**	.094	-.062	-.017	.043	-.042	-.034
UDTV			1	.048	.160**	.188**	-.143*	-.095	.053	-.094	-.021
UDPC				1	-.007	.213**	-.141*	-.116	.164**	-.044	.057
UDTB					1	-.029	-.062	.021	.082	-.052	.058
UDTM						1	.058	.093	-.050	.103	.056
GF							1	.539**	-.147*	.690**	.329**
GE								1	-.228**	.535**	.322**
GCA									1	-.160**	-.002
GA										1	.441**

Note 1. Daily time spent on physical activity (TDAF); Hours of daily sleep (HSD); Daily use of video game consoles (UDVC); Daily use of television (UDTV); Daily use of computers (UDPC); Daily use of tablets (UDTB); Daily use of mobile phone (UDTM); Degree of happiness (GF); Degree of energy (GE); Degree of tiredness (GCA); Degree of self-esteem (GA); Degree of creativity (GCR).
Note 2. Pearson's bivariate correlation at the significance level of p < .05 (*) and p < .01 (**).

DISCUSSION

Sleep and rest in early childhood

The results of this research show that the sleep hours in children aged 0 to 4 years were lower than those recommended by the WHO, which coincides with other studies (McNeill, Howard, Vella & Cliff, 2020) that indicated that the majority of young children did not meet sleep guidelines. Following these contributions, Ji et al. (2018) noted that Chinese preschool students demonstrated poor sleep habits.

According to other authors (Huang, Lai, Xing, & Wong, 2019), the children slept for 9.72 hours per night. Sleep duration in the previous night was positively associated with daytime PA. Chaput et al. (2017) indicated that longer sleep duration was generally associated with better body composition, emotional regulation and growth in children aged 0 to 4 years. Shorter sleep duration was also associated with greater use of screen time. For Price et al. (2014) sleep duration decreased from a median peak of 14 hours at 4–6 months to 10 hours at 9 years, primarily due to an onset of sleep from 8:00 p.m. to 9:00 p.m. According to another study (Armstrong et al., 2019), young children averaged 10.56 hours of sleep in 24 hours. 32% of young children slept 11-14 hours for 24 hours, and 26% went to sleep before 9:00 p.m. Guan et al. (2020), in interviews conducted with parents of preschool-age children in Beijing, China, found that, compared to pre-COVID-19, almost all children went to bed later and woke up later. Other authors (Leppänen et al., 2019) in their study carried out with Finnish children had an average of 10:21 h: min / day of sleep, the rate of compliance with the recommendations being 76%. In another investigation (Hinkley et al., 2020) it was indicated that the majority of children met the guidelines for PA (89%) and sleep (93%). De Craemer, McGregor, Androutsos, Manios and Cardon (2018) showed that the majority of preschool-age children met the sleep duration guidelines (> 90% on weekdays and weekend days). Children slept significantly more during the weekends (8.3 ± 0.9 h) than during the week (8.1 ± 0.7 h) ($p = .037$). A significantly higher proportion of students also fell asleep before 10:00 pm on weekends (26.8%) compared to weekdays (15.2%). On the other hand, Berglind, Ljung, Tynelius and Brooke (2018) pointed out that 18.4% of the total sample of their research complied with the combination of PA, sleep duration and screen time recommendations. In isolation, 31%, 63%, and 98% of the total study sample met the guidelines for PA, screen time, and sleep, respectively (Berglind et al., 2018).

Physical activity during early childhood

In the results of this research, levels of PA below the recommended level were detected, with the highest mean values for the age group of 1 to 2 years, which coincides with other research (Guan et al., 2020) carried out during confinement, in which the PA levels were very low, since the children could not go outside to play. These same authors (Guan et al., 2020) noted that the use of sports facilities had decreased by 94% during confinement time in South Korean children. Data from the pre-COVID-19 period show that, on average, only a fifth of pre-schoolers and less than 10% of school-age children meet all movement and PA guidelines. Likewise, De Craemer et al. (2018) found low percentages of PA in preschool-aged children. Similarly, Ji et al. (2018) indicated that Chinese preschool students did little PA.

On the other hand, Tremblay et al. (2017) pointed out that 62-84% of Canadian pre-schoolers (from 3 to 4 years old) meet the PA guidelines, with children from 1 to 2 years of age mostly complying with the PA guidelines. Following these lines, there are studies (Gutierrez-Hervas, Cortés-Castell, Juste-Ruíz & Rizo-Baeza, 2019) that showed that pre-schoolers spent more than 100 minutes daily in a sedentary manner. Most of the sample complied with the European recommendations for moderate to vigorous daily PA, but this depended on the sex and weight of the child. Thus, overweight and obese children spent less time on moderate to vigorous PA and more time on sedentary activities. All groups spent between 90 and 130 minutes

a day in sedentary activities, with an average time that represented 15.5% of their time, excluding the time they spent sleeping (Gutierrez-Hervas et al., 2019). Following these contributions, Ji et al. (2018) indicated that the amount of time spent daily doing vigorous activity during the week and on weekends was significantly different, with an average time of 20.5 ± 31.6 min and 10.3 ± 15.3 min respectively. According to other authors (Huang et al., 2019), the children accumulated 2.37 hours of PA per day. Instead, Leppänen et al. (2019) indicated that the children were physically active for an average of 390 min / day and had 86 min / day of moderate to vigorous PA. The compliance rate of the three movement guidelines in general was 24%. Among Finnish children, the highest rate was found for PA with 85% (Leppänen et al., 2019). Other authors (Armstrong et al., 2019) noted that all young children performed ≥180 minutes of total activity per day, and 38% had ≥60 minutes of moderate / vigorous PA per day.

Other studies (Moreno et al., 2020) indicated that the majority of children go to school on foot or by car in the same percentage, 87% do extracurricular sports and 78% of them 2-6 times a week. The results of other research (Cantero, Mayor, Toja & González, 2019) suggest that 66.9% of students have an activity index that is not very active or very little active (56% boys compared to 77.3% girls). According to Tey, Wake, Campbell, Hampton and Williams (2007), only 49% of children spent some time walking for transportation or pleasure. According to these authors (Tey et al., 2007) children spent an average of 71% of their time in activities that were probably physically active when they were outdoors, compared to 3% when they were indoors, but they averaged only 110 minutes / day outdoors.

Ajejas et al. (2018) showed that the prevalence of overweight and obesity in Spain was increasing. The prevalence of overweight and obesity was higher in boys than in girls. According to 2011 data, children who did not have any type of PA or whose parents had a low level of education showed the highest prevalence of obesity (Ajejas et al., 2018). Following these contributions, Edo Martínez et al. (2010) indicated that the average BMI is higher in the most inactive children, when the mother's educational level is low. Instead Hinkley, Salmon, Okely, Hesketh, and Crawford (2012) noted that girls' preference was to play indoors, draw, and do crafts rather than doing more PA.

Screens and device use in early childhood

Regarding the daily time children spend in front of the screens, the highest values were found on television and in the age range between 3-4 years. Likewise, Leppänen et al. (2019) showed that Finnish children spent 76 min / day in front of screens, with 35% complying with the recommendations on the use of these devices. According to Tremblay et al. (2017) only 18-24% meet current screen time recommendations. For Hinkley et al. (2020) 23% met screen time guidelines. For Downing, Hinkley, Salmon, Hnatiuk, and Hesketh (2017) preschool-age children can spend up to 12 hours per day in sedentary time, and few meet current recommendations for screen time. The children were sedentary for 301.1 minutes / day and spent 108.5 minutes a day using display devices (Downing et al., 2017). The results of another investigation (Amigo, Busto, Herrero & Fernández, 2008) showed that sedentary leisure (number of hours of television, computer and console) maintains a significant and inverse relationship with hours of sleep and PA. In South Korea, 81% reported that their children's sedentary time in front of a screen had increased during confinement time (Guan et al., 2020). Instead, De Craemer et al. (2018) indicated in their research that the majority of preschool-age children met screen time guidelines (61% on weekdays and 28% on weekend days).

For their part, Duque and Parra (2012) pointed out the high number of hours of exposure of children in front of the screens. Thus, the average time spent on screens was 4.96 hours / day, with boys spending more time on screens compared to girls. Following these lines, García-Soidán et al. (2020) showed that the exposure to screens of Spanish children is 15 hours a week, and that their lifestyle falls within health standards in terms

of hours of rest and PA habits. According to Moreno et al. (2020), the time they are watching television or with video games varies from less than 1 hour to 2 hours during the week and on weekends, with 52% dedicating 2 hours to these activities (Gordillo, Herrera & García, 2019). Sasaki et al. (2010) indicated that 26.9% of preschool-age children reported 2 or more hours of television a day and 8.2% were defined as obese. Total screen viewing time at age 2-3 years had a significant negative association with sleep, light PA, and moderate to vigorous PA relative to sedentary behaviour at 5 years. (Chen et al., 2020). Compared to children who spent 1 hour or less per day viewing the screen at the age of 2 to 3 years, children who viewed the screen for 3 hours or more per day at the age of 2 to 3 years engaged in more sedentary behaviour. In addition, they observed similar trends in television viewing and portable devices (Chen et al., 2020). According to other research (Hinkley et al., 2018) children spent an average of 2.0 and 2.2 hours per day in front of the screen, and 3.3 and 2.9 hours per day in outdoor games.

The results of Chacón Cuberos et al. (2015) showed that a sixth of the study population was overweight and that the majority had a video game console. Other authors (Gordillo et al., 2019) indicated that 6 out of 10 respondents to their research preferred video games with movement over traditional ones. Feijoo and García-González (2016) were able to show that video games occupy a prominent place in the leisure time of children, who prefer the console to play before other devices such as the PC or mobile phone. For his part, Cuixart (2006) considers how electronic screens are, for the children he calls "*high risk*", an escape route to an unreal world where life is seen with different eyes. According to Martín (2016) almost 80% of children frequently use this new device for entertainment, which gives them autonomy and freedom to access a multitude of content; therefore, the smallest are not finding educational content in them.

Kaur et al. (2019) established that the burden of screen time ranged from 21% to 98% in middle-income countries, and from 10% to 93.7% in high-income countries. This research (Kaur et al., 2019) advised limiting screen exposure based on the child's age. According to other authors (Tamana et al., 2019) more than 95% of children had full access to screens. The average detection time was 1-4 hours / day at five years and 1-5 hours / day at three years. Increased screen time in preschool is associated with greater problems of inattention (Tamana et al., 2019).

For other researchers (Watanabe, Lee, Mori & Kawakubo, 2016) the group with the highest amount of screen time and the shortest duration of night time sleep and outdoor playtime had the highest prevalence of overweight / obesity (15.1%), while the group with the shortest screen time, the longest sleep duration and the longest average outdoor play time had the lowest prevalence (4,0%). According to these authors (Watanabe et al., 2016) to prevent overweight / obesity, children should focus on reducing screen time and increasing the duration of night sleep. Following these lines, the results of other authors (Janssen et al., 2020) indicated that screen time is associated with poorer sleep outcomes in infants, toddlers, and young children. PA and outdoor play in particular were associated favourably with most sleep outcomes in toddlers and pre-schoolers (Janssen et al., 2020).

CONCLUSIONS

It is concluded that during the period of confinement, the sample of children under 5 years of age in this study did not comply with the recommendations for daily PA practice and the use of screens established by the WHO, which could further aggravate the health problems associated with sedentary lifestyle in the early childhood. Regarding sleep recommendations, the recommended minimum levels were reached, with the degree of fatigue being lower in children aged 1-2 years. It is highlighted that the daily hours of sleep were indirectly related to the time in front of game consoles, television and tablets. Thus, it has been observed in

this study that the health of children has been compromised, in a certain way, during confinement. For all these reasons, educational and political institutions are recommended to establish social and educational policies that guarantee a minimum of information and training for parents so that they can establish their own strategies at home to encourage the practice of physical activity in children under 5 years, promoting their rest and sleep and reducing the consumption of technological devices, thus avoiding the appearance of hypokinetic pathologies.

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All authors have participated in the different parts of preparing this research and writing the manuscript.

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