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Physical Activity, Sedentary Behavior and Sleep Duration Among Albanian School-Aged Children During the COVID-19 Lockdown

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Abstract

Introduction: The COVID-19 pandemic significantly disrupted children's routines, affecting their physical activity, sedentary behaviors, and sleep patterns.

Objectives: This study aimed to assess the impact of the pandemic on physical activity, sedentary time, and sleep duration among Albanian schoolchildren, with a focus on differences by weight status.

Methods: This cross-sectional study was conducted as part of the sixth round of the Childhood Obesity Surveillance Initiative (COSI). It utilized parent/caregiver-completed forms to assess children's behaviors, including physical activity, sedentary behavior, and sleep duration, during the school year and the COVID-19 pandemic lockdown.

Results: During the pandemic, sedentary behaviors such as screen time increased for 21.6% of children on weekdays and 21.3% on weekends, with no significant variation by BMI. Active play decreased in 22.2% of children on weekdays and 19.7% on weekends, again with no major differences across BMI categories. Sleep time increased for 10% of children on weekdays and 14% on weekends, except for children with obesity, where an 11% decrease in weekday sleep was observed. Additionally, the proportion of children increasing weekend sleep decreased as BMI rose. About half of the children maintained consistent sedentary leisure patterns, while the rest experienced either increases or decreases.

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Conclusion: The decline in physical activity, coupled with increased screen time during the pandemic, poses a heightened risk for overweight and obesity among Albanian children, potentially exacerbating existing weight issues.

Keywords: Physical Activity, Sedentary Behavior, Sleep, COVID-19, Child Health, Pandemics

BACKGROUND

The global COVID-19 pandemic had a significant impact on people's lives and health. While population-wide isolation measures limited the spread of the coronavirus, they also disrupted daily routines, affecting physical and mental health. Several studies have explored these impacts using various health indicators (1). Daily routines, including school attendance and extracurricular activities, play a crucial role in maintaining healthy physical activity (PA) and sleep habits in children (2). However, the pandemic severely disrupted these routines, likely influencing health behaviors such as PA and sleep (3,4).

Adequate PA is vital for children's cognitive, motor, social, and physical development, including musculoskeletal, cardiovascular, and metabolic health (5). It also helps prevent and manage childhood obesity (6), which is associated with serious health risks, psychosocial issues (7-9) and increased chances of non-communicable diseases (NCDs) later in life (10-15).

During the pandemic opportunities for active play, recreation, and transportation declined, while sedentary screen time increased (14).

High PA levels, low sedentary behavior (SB), and adequate sleep are essential to reducing energy-dense food consumption and preventing childhood obesity (11,12). These behaviors are especially important for managing the health of children with pre-existing obesity (13).

In Albania, childhood obesity is a significant public health issue caused by various factors (16-18).

This study aimed to investigate the effects of COVID-19 home confinement on PA, SB, and sleep duration in Albanian schoolchildren and assess differences by weight status. To date, this is the first national study of its kind in Albania to evaluate the impact of pandemic restrictions on these health parameters.

OBJECTIVE

The aim of our study was to investigate the effect of the COVID-19 pandemic on physical activity, sedentary time, and sleep duration in Albanian schoolchildren and to assess the differences according to their weight status.

STUDY DESIGN

Data collection occurred during the 2022-2023 school year. This study was conducted in the framework of the sixth round of the Childhood Obesity Surveillance Initiative (COSI), following the common COSI protocol for sample design (16,19-21). According to the protocol, primary schools were the setting of enrollment and the target population consisted of children aged 8.0-8.9 years enrolled in primary school and their families (16).

A one-stage stratified cluster sampling technique was used, with primary schools serving as the main clusters or primary sampling units.

Information on children's PA, screen time, and

sleep duration during the pandemic was collected using a paper questionnaire, in addition to the COSI &COVID-19 voluntary family record form, completed by a parent or caregiver (20).

The COSI &COVID-19 data collections adhered to the International Ethics Guidelines for Biomedical Research Involving Human Subjects (22). This national survey also received ethical approval from the Ethics Committee of the Ministry of Health and Social Protection (16).

Parents were fully informed about the study procedures and data handling, and their informed consent was obtained on a voluntary basis. This was done either by letter or at a school information meeting. The confidentiality of all data collected and archived was assured.

Information from the COSI family form included the following 3 behaviors: number of hours of sleep per night, time spent actively playing, and time spent watching television or using electronic devices. Table 1 shows the questions of interest and their predefined response options for each of the categorical variables included in the analysis.

Table 1. The questions of interest and their corresponding predefined response options.

During the COVID-19 pandemic period indicates whether YOUR CHILD´s life changed in comparison to the pre-COVID period.	**Decreased in comparison to pre-COVID period**	**Stayed the same in comparison to pre-COVID period**	**Increased in comparison to pre-COVID period**	**I don´t know**
Q1. Amount your child slept **on weekdays**				
Q2. Amount your child slept **on weekend**				
Q3. Time your child spent outside school hours, playing actively/vigorously (e.g. running, jumping outside or moving and fitness games inside) on **weekdays**				
Q4. Time your child spent outside school hours, playing actively/vigorously (e.g. running, jumping outside or moving and fitness games inside) on **weekend**				
Q5. Spending time watching TV, playing video/computer games, or using social media for non- educational purposes on **weekdays**				
Q6. Spending time watching TV, playing video/computer games, or using social media for non- educational purposes on **weekend**				

RESULTS

A total of 3,159 parents/guardians were invited to complete the questionnaire. About 85.6% of all questions were answered (varying from 84.9% in Q2 to 86.2% in Q1). However, one parent did not complete the questionnaire because their child declined to participate in the study. The majority of respondents were mothers (88.8%), followed by fathers (9.8%) and others (1.4%) (data not shown in tables).

1. Children's sleep patterns during the Pandemic Compared to the Pre-Pandemic Period by Nutritional Status (Aged 8–8.99 Years in Albania).

Parents were asked whether their child's sleep patterns changed during the pandemic compared to the pre-pandemic period, both on weekdays and weekends.

For most children, sleep patterns remained unchanged overall and across BMI categories before and during the pandemic (Table 2). However, a smaller proportion of obese children reported an increase in sleep duration on both weekdays and weekends compared to children with a normal BMI. Notably, the proportion of children experiencing an increase in sleep on weekends declined consistently with higher BMI categories.

Table 2. Changes in children's sleep patterns during the pandemic compared to the pre-pandemic period by BMI category (%)

BMI	Sleep pattern **WEEKDAYS**				P-value*	**WEEKENDS**				P-value*
	Decreased	**Stayed the same**	**Increased**	**Don't know**		**Decreased**	**Stayed the same**	**Increased**	**Don't know**	
Thin	5	77	8	2	>0.05	5	67	13	3	>0.05
	5.4%	83.7%	8.7%	2.2%		5.7%	76.1%	14.8%	3.4%	
Normal	161	1412	195	47		107	1354	266	63	
	8.9%	77.8%	10.7%	2.6%		6.0%	75.6%	14.9%	3.5%	
Overweight	38	342	49	7		27	337	55	9	
	8.7%	78.4%	11.2%	1.6%		6.3%	78.7%	12.9%	2.1%	
Obese	43	299	29	8		36	286	43	11	
	11.3%	78.9%	7.7%	2.1%		9.6%	76.1%	11.4%	2.9%	
Total	247	2130	281	64		175	2044	377	86	
	9.1%	78.3%	10.3%	2.4%		6.5%	76.2%	14.1%	3.2%	

* P-value according to chi-square test.

2. Time spent actively/vigorously play during the pandemic in comparison to the pre-pandemic period.

Overall, a greater proportion of children experienced a decrease in active/vigorous playtime during the pandemic compared to the pre-pandemic period across all BMI categories, but these changes did not reach statistical significance (Table 3). In addition, no consistent trends were observed in the relationship between changes in playtime and children's BMI.

Table 3. Changes in the time children spent actively/vigorously playing outside of school during the pandemic compared to the pre-pandemic period, by BMI category

BMI	Time spent **WEEKDAYS**				P-value*	**WEEKENDS**				P-value*
	Decreased	**Stayed the same**	**Increased**	**Don't know**		**Decreased**	**Stayed the same**	**Increased**	**Don't know**	
Thin	21	50	12	6	>0.05	17	49	16	5	>0.05
	23.6%	56.2%	13.5%	6.7%		19.5%	56.3%	18.4%	5.7%	
Normal	400	989	343	79		351	1030	342	79	
	22.1%	54.6%	18.9%	4.4%		19.5%	57.2%	19.0%	4.4%	
Overweight	103	251	62	15		88	260	68	18	
	23.9%	58.2%	14.4%	3.5%		20.3%	59.9%	15.7%	4.1%	
Obese	77	224	60	14		75	223	65	14	
	20.5%	59.7%	16.0%	3.7%		19.9%	59.2%	17.2%	3.7%	
Total	601	1514	477	114		531	1562	491	116	
	22.2%	55.9%	17.6%	4.2%		19.7%	57.9%	18.2%	4.3%	

* P-value according to chi-square test.

3. Distribution of sedentary recreational screen time during the pandemic compared to the pre-pandemic period by nutritional status in children aged 8–8.99 years in Albania.

Overall, time spent on sedentary recreational activities such as watching TV, playing video or computer games, or using social media for non-educational purposes increased during the pandemic for more than one in five children but these changes were not statistically significant. A similar proportion experienced a decrease, while the remainder—approximately half—reported no change. These patterns were consistent across BMI categories, with no significant differences observed (Table 4).

Table 4. Change in children's sedentary recreational screen time during the pandemic compared to the pre-pandemic period by country, by their BMI

BMI	Sedentary time **WEEKDAYS**				P-value*	**WEEKENDS**				P-value*
	Decreased	**Stayed the same**	**Increased**	**Don't know**		**Decreased**	**Stayed the same**	**Increased**	**Don't know**	
Thin	19	45	24	19	>0.05	15	45	22	5	>0.05
	21.3%	50.6%	27.0%	21.3%		17.2%	51.7%	25.3%	5.7%	
Normal	389	977	400	389		371	977	387	69	
	21.4%	53.8%	22.0%	21.4%		20.6%	54.2%	21.5%	3.8%	
Overweight	95	242	86	95		83	246	91	15	
	21.9%	55.8%	19.8%	21.9%		19.1%	56.6%	20.9%	3.4%	
Obese	75	215	77	75		77	214	75	11	
	19.8%	56.9%	20.4%	19.8%		20.4%	56.8%	19.9%	2.9%	
Total	578	1479	587	578		546	1482	575	100	
	21.3%	54.4%	21.6%	21.3%		20.2%	54.8%	21.3%	3.7%	

* P-value according to chi-square test.

DISCUSSION

Compared to pre-pandemic period, the sleep patterns of most Albanian children did not show statistically significant changes during the pandemic, with 78% maintaining the same sleep routine on weekdays and 76% on weekends. This prevalence is slightly higher than that reported in a European study (23) involving 17 WHO Europe member countries (including Albania), where 75% of children maintained consistent sleep patterns.

When changes in sleep duration occurred, increases were more common than decreases. On average, 10% of Albanian children increased their sleep time on weekdays, and 14% did so on weekends. However, among children with obesity, a decrease in sleep time was observed on weekdays during the pandemic (11%). These figures are lower compared to European data, where, on average, 15% of children increased their sleep time on weekdays and 17% on weekends (23).

San Marino reported the highest increase in weekday sleep among children during the pandemic (26%), while Uzbekistan showed the highest increase in weekend sleep (33%) (23).

Among Albanian children, as BMI increased, the proportion of those experiencing an increase in weekend sleep time decreased consistently.

When asked whether the amount of time Albanian children spent playing actively or vigorously outside of school hours changed during pandemic restrictions, more than half of the parents reported that their children spent the same amount of time on these activities (56% on weekdays and 58% on weekends). This prevalence is slightly higher than the European average, where about half of the children maintained the same level of activity (51% on weekdays and 56% on weekends) (23).

A decrease in activity was reported for 22% of Albanian children on weekdays and 20% on weekends, with no significant trends observed in relation to children's BMI. Compared to European children, Albanian children were slightly more active, with decreases in activity observed in 28% of European children on weekdays and 23% on weekends (23).

In most countries, when changes in activity levels occurred, decreases were more common than increases. The highest decreases were reported in Italy, Malta, and San Marino, where over 40% of children experienced reduced activity levels. In contrast, the lowest decreases were observed in Azerbaijan, Georgia, Kazakhstan (Almaty), and the Republic of Moldova, where less than 15% of parents reported reduced activity (23).

Internationally, the sedentary behaviors among children during the pandemic increased significantly (23). In Albania a similar pattern was observed even though the changes in sedentary behaviors were not significant. For example, 21.6% of Albanian children spent more time watching TV, playing video or computer games, or using social media for non-educational purposes on weekdays, and 21.3% on weekends during the pandemic. Conversely, the proportion of children who reduced their screen time was

slightly lower, at 21.3% on weekdays and 20.2% on weekends. Changes in recreational screen time among Albanian children during the pandemic, compared to the pre-pandemic period, showed no significant variation across different BMI categories.

In contrast, 36% of European children, on average, increased their sedentary recreational screen time on weekdays and 34% on weekends during the pandemic—substantially higher than the 21.6% observed among Albanian children. Furthermore, the percentage of European children who decreased their screen time (9.5%) was significantly lower than that of Albanian children (20.2%) (23). Malta and San Marino reported the highest levels of children engaging in sedentary leisure activities compared to pre-pandemic levels, with over 60% of children increasing their screen time on weekdays and over 50% on weekends (23).

CONCLUSIONS

Our data indicate that the behaviors most affected during the pandemic, in terms of the percentage of children engaging in them, were an increase in time spent watching TV or using electronic devices on both weekdays and weekends. In contrast, the behaviors that showed the most significant decrease were time spent actively playing outdoors on both weekdays and weekends.

Given that children who meet both physical activity and screen time recommendations are less likely to be classified as overweight or obese than those with other behavior combinations (24), a decrease in physical activity coupled with an increase in sedentary screen time may elevate the risk of overweight and obesity in Albanian children, or exacerbate the severity of obesity in children already affected by it.

These findings offer valuable insights for parents, teachers, and public health professionals into the behavioral changes that occurred during the lockdown, helping to identify the most effective interventions to protect the physical health of Albanian children in the post-pandemic era.

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