

# RESTRICTION OF PHYSICAL ACTIVITY IS THE MAIN CAUSE OF CHILDHOOD OBESITY DURING THE COVID-19 PANDEMIC – REFLECTIONS FROM A STUDY CONDUCTED IN 3 CLINICAL CENTERS IN SOUTHERN POLAND

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## INTRODUCTION

On March 4th 2020, the first confirmed case of SARS-CoV-2 infection was announced in Poland. On March 16<sup>th</sup>, schools and kindergartens closed and subsequent restrictions were introduced in Poland. Sudden and radical changes in daily habits and lifestyles of the children and adults occurred with a drastic reduction of any form of socialization and physical activity. Home-isolation strongly impacted everyday life, affecting, in particular, eating habits and everyday behaviors. Due to restrictions on free movement, school closures, and changing diets around the world, cases of "covibesity" have been reported in children and adolescents.

## AIM

The aim of this study was to analyze the impact of the COVID-19 pandemic lockdown on behaviors and subsequent changes in BMI in children from southern Poland.

## PATIENTS

- 177 participants (96 F, 81 M) (age: mean 12.8±2.6 years, range 5.7-18.5 years)
- outpatients visiting endocrinology, diabetes, and metabolic disease units in 3 pediatric endocrinology clinics (Rzeszów, Kraków, Katowice) between June and September 2020.

The purpose of visit in the outpatient	Number (%)
Obesity	64 (36.2)
Type 1 diabetes	36 (20.3)
Growth hormone deficiency	39 (22.0)
Thyroid disorders	10 (5.6)
Turner syndrome	7 (4.0)
Other endocrine disorders	15 (8.5)
Lipids/carbohydrates metabolism disorders	6 (3.4)

The study was conducted according to the Helsinki declaration and approved by the Ethics Committee of The Medical University of Silesia (PCN/0022/KB1/117/20).

## RESULTS

**Table 2.** Changes in BMI z-score before and after the lockdown

BMI z-score	Before lockdown (mean±SD)	During lockdown (mean±SD)	Δ (mean±SD)	P
Study group (n=177)	0.79±1.35	0.86±1.31	0.07±0.34	0.006
Females (n=96)	0.84±1.34	0.89±1.37	0.05±0.32	0.1
Males (n=81)	0.73±1.36	0.82±1.26	0.09±0.36	0.02
Obese (n=64)	2.02±0.44	2.10±0.38	0.07±0.18	0.002
Non-obese (n=113)	0.09±1.18	0.16±1.27	0.07±0.40	0.064

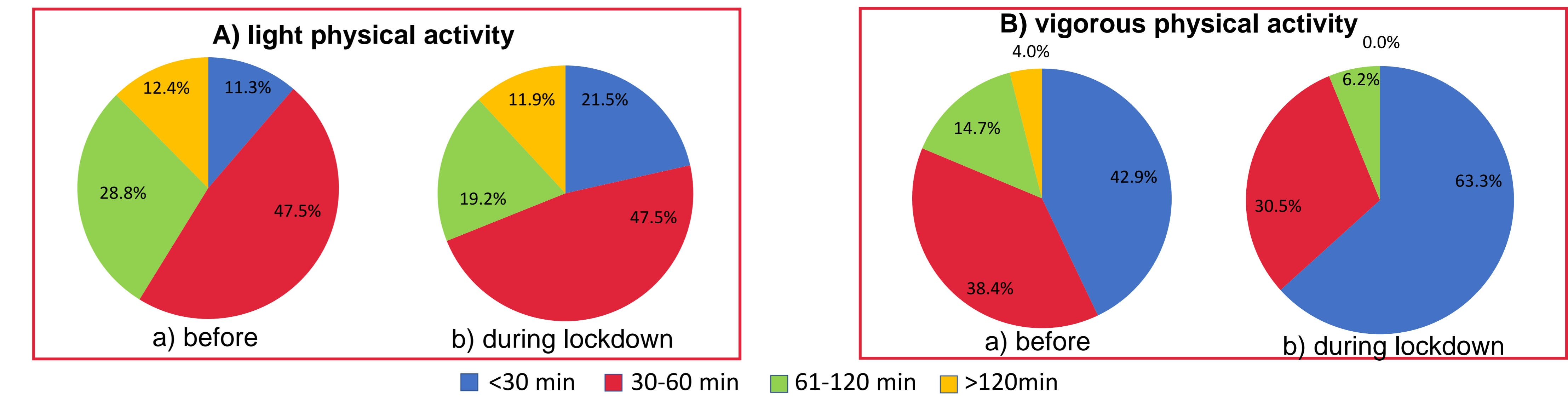
**Table 3.** Physical activity, computer usage and dietary preferences before and during the lockdown

Variable	Before lockdown (mean±SD)	During lockdown (mean±SD)	Δ (mean±SD)	P
Light physical activity [rated 1 to 4]	2.43±0.85	2.22±0.93	-0.20±0.88	0.002
Vigorous physical activity [rated 1 to 4]	1.80±0.83	1.43±0.61	-0.37±0.95	<0.001
Amount of sleep [rated 1 to 4]	2.45±0.71	2.73±0.74	0.28±0.60	<0.001
Screen time [rated 1 to 5]	2.66±0.92	3.32±1.25	0.66±1.07	<0.001
Numer of meals per day [rated 1 to 5]	4.25±0.74	4.29±0.71	0.04±0.63	0.41
Snacks/sweets consumption [rated 1 to 6]	2.64±0.96	2.55±1.08	-0.09±0.75	0.11
Soda/Juices consumption [rated 1 to 6]	2.29±1.32	2.21±1.27	-0.08±1.0	0.29
Vegetable consumption [rated 1 to 6]	3.44±1.10	3.34±1.11	-0.10±0.87	0.14
Fruit consumption [rated 1 to 6]	3.42±1.08	3.42±1.19	-0.006±0.91	0.93
Fast-food meals consumption [rated 1 to 6]	1.41±1.11	1.36±1.07	-0.05±0.65	0.30

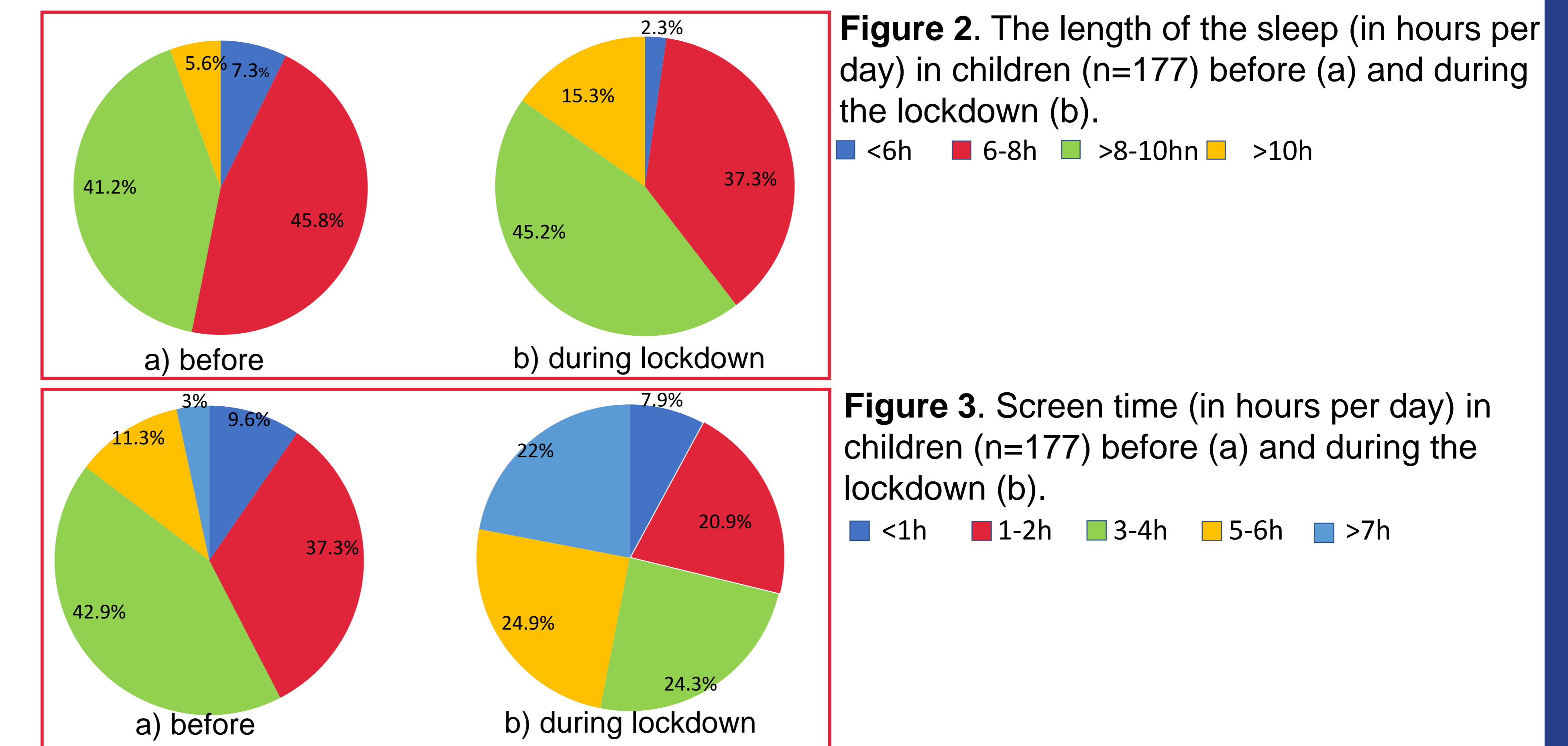
## METHODS

1. All participants and/or their parents/guardians were asked to fulfil an **self-prepared questionnaire** regarding:
  - **eating habits** (1 question regarding amount of meals, 5 questions about the frequency of consumption of: sweet snacks, soft drinks, vegetables, fruits, fast-food dishes),
  - **physical activity** (2 questions about time during the day dedicated for light and vigorous physical activity),
  - **screen time** (in the part dedicated to pandemic period, additional question about time of e-learning)
  - **sleep time**
2. **Anthropometric measurements** in patients - performed under clinical settings twice:
  - before the pandemic (January-March 2020),
  - during lockdown (in June-September 2020)

before & during lockdown



**Figure 1.** The amount of light (A) and vigorous (B) physical activity (in minutes per day) in children (n=177) before (a) and during the lockdown (b).



**Figure 2.** The length of the sleep (in hours per day) in children (n=177) before (a) and during the lockdown (b).

**Figure 3.** Screen time (in hours per day) in children (n=177) before (a) and during the lockdown (b).

## RESULTS

The amount of children who declared light and vigorous physical activity of more than 60 minutes per day declined from 41.2% and 18.6% to 31.1% and 6.2% (p=0.03 and p<0.001) respectively; sleep times over 8 hours increased (46.9% vs. 60.4% p=0.007); screen times over 5 hours daily increased (14.7% to 46.9%, p<0.001).

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## CONCLUSIONS

**One of the main factors affecting BMI Z-score during the pandemic is limitation of physical activity.**

**Beyond the short-term effects of the COVID-19 pandemic, forward-thinking strategies must be developed to prevent unprecedented increase in childhood obesity.**

## CONTACT INFORMATION

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