

THE IMPACT OF THE PANDEMIC ON THE MOTOR CAPACITY OF SECONDARY SCHOOL STUDENTS

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Abstract. *The COVID-19 pandemic has disrupted most aspects of daily life. In the spring of 2020, the incidence rate of Sars-CoV-2 increased rapidly in Romania and throughout the world. During that period, the access points for physical activities (sports clubs, swimming pools, gyms, community centers) could no longer carry out their activity. For the next 2 years, schools were temporarily closed and social distancing measures were instituted to slow the spread of the Covid-19 virus. To avoid the negative effects of the lockdown, the education administration resumed face-to-face teaching for the 2020-2021 school year and made many changes, including rules and recommendations for a safe return to school. National and international organizations have issued basic principles and guidelines for the prevention of COVID-19 when educational institutions reopened. The decline in physical activity has been linked to Covid-19 restrictions, including social distancing, disruption of school hours, distance learning and increased sedentary time for children. These changes were seen as a real challenge in physical education. These social restrictions and the temporary closure of the school affected the physical condition of the children. In this research, we will analyse and compare how the Pandemic affected the motor capacity of the 6th grade students from the Bucharest Secondary School No. 2, respectively the 2020-2021, 2021-2022 school years.*

Keywords: *motor capacity; effort capacity; COVID-19 pandemic; secondary school.*

Introduction

Since March 2020, the daily travel and exercise habits of many people of all ages, including school-age children, have changed due to lockdowns and closures due to the coronavirus (COVID-19) pandemic.

Public health restrictions have been put in place to reduce viral transmission. These restrictions led to changes in health behaviors such as physical activity. Maintaining adequate levels of physical activity is associated with a lower risk of death and chronic diseases such as cardiovascular disease, diabetes, depression, anxiety and many types of cancer. In the context of the COVID-19 pandemic, there is ample evidence demonstrating the importance of physical activity in reducing the impact of pandemic stress on individuals. In addition, there is evidence that physical fitness is positively associated, such as improved immunity. According to research studies, many people's fitness and physical activity levels have decreased during the COVID-19 pandemic (Colley et al., 2022).

Cheval et al., (2020) selected a group of people living in Switzerland who completed an online questionnaire measuring physical activity, physical and mental health, anxiety and depressive symptoms. T-tests were used to assess differences between physical activity and sedentary behavior before and during the block.

It was found that the Lockdown led to an increase in walking time and distances, moderate physical activity (approximately 10 minutes per day) and sedentary activities (approximately 75 minutes per day) compared to pre-Covid-19 periods. Furthermore, increased sedentary

behavior during leisure time was associated with decreased physical and mental health and subjective vitality. Ensuring adequate levels of physical activity and reducing sedentary time can play an important role in helping people cope with major stressful events such as the COVID-19 pandemic.

Frömel et al., (2022) conducted a study in which he selected students from Czech and Polish schools during the academic research period of higher education in 2019-2020 and the session in 2020-2021. Girls and boys between the ages of 13 and 15 participated in the study. Physical activity methods were assessed using the International Long Physical Activity Questionnaire, and health status was assessed using the World Health Organization's Well-being Index 5. They observed the decrease in physical activity and the increase rates of depressive symptoms among young distance learners during pandemic restrictions, prompting schools to support physical exercise.

In a study carried out on a group of students from Istanbul, a significant difference in the levels of physical activity of the subjects was identified according to age, sex, type of sports activity due to the Covid19 epidemic (Çevik et al., 2023).

Patti et al., (2022) carried out a study in Italy that evaluated the fitness level of students who attended physical education and sports classes at school, based on a sports program during 2021, respecting the safety rules to limit the spread of Covid, compared to traditional schools. The assessment of fitness levels was carried out by administering some tests when the incidence of illness with covid allowed the resumption of lessons, and 2 months after their resumption. In the study, it was found that the period of reduced activity during the epidemic caused a decrease in the fitness level of teenagers.

A study carried out in the Czech Republic had as its objective the evaluation of the level of physical activity of children during the Covid epidemic, in the fall of 2020. The method used was to compare the data recorded in standardized physical activity questionnaires during the blocking of activity due to illness, with the previously published norms. It was found that the blocking of activities due to the Covid epidemic led to a significant reduction in physical activity (Štveráková et al., 2021).

Purpose of the study

The purpose of the study was to identify the various forms and ways in which the Pandemic affected the effort capacity of the students selected in the study. For this purpose, in this paper we analysed the results from the control tests from school year 2020-2021, 2021-2022 and we compared how and to what extent the Pandemic affected the effort capacity of the students.

Research questions

In this study we answered two research questions:

Has the pandemic affected the effort capacity of students?

Is there any difference in results between the 2020-2021 and 2021-2022 school years?

Subjects and methods

In this research there were included 20 subjects, from the 6th grade, coming from Secondary School No. 27.

As research methods we used:

- The bibliographic study, through which we identified suitable information for the realization of this study;

- The observation method by which we collected and analysed the students' results obtained in the control tests in the school years 2019-2020, 2020-2021, 2021-2022;
- Motor tests used in this research were:
 - 2019-2020- Speed 25m, dorsal trunk lift, trunk extension lying face down jump standing long;
 - 2020-2021, 2021-2022- Speed 50 m, dorsal trunk lift face down, long jump, technical procedures basketball;
- The statistics and mathematical method in which we analyzed the values of the results and compared them.

Results

In Table 1, we present the comparison of the parameters between the initial and final values measured in the 6th grade students. The distribution of the parameters investigated between the measurements was non-parametric according to the Shapiro-Wilk test ($p < 0.05$). According to Wilcoxon tests, all parameters had a significant improvement in the final value compared to the initial value ($p < 0.05$).

Table 1. *Comparison of the parameters between the initial and final values measured in students of the 6th grade*

Parameter	Initial testing		Final testing		p*
	Average±SD	Median (IQR)	Average±SD	Median (IQR)	
Measurements – 2019-2020					
Speed – 25m	5.73 ± 0.18	5.78 (5.63-5.85)	5.52 ± 0.13	5.53 (5.39-5.65)	<0.001
Dorsal trunk lift	12 ± 1.51	12 (10-14)	12.82 ± 1	12 (12-14)	0.007
Trunk extension lying face down	12.36 ± 1.36	12 (11-14)	13.09 ± 1.06	13 (12.75-14)	0.005
Jump - standing long	1.27 ± 0.05	1.25 (1.2-1.3)	1.3 ± 0.04	1.3 (1.29-1.35)	0.001
Measurements – 2020-2021					
Speed – 50m	9.26 ± 0.78	9.4 (8.62-9.86)	9.04 ± 0.67	9.32 (8.48-9.5)	<0.001
Dorsal trunk lift	19 ± 3.42	19 (16-21.25)	19.5 ± 3.43	20 (16.75-22)	0.005
Trunk extension lying face down	20.55 ± 3.66	20.5 (19.25-23)	21.14 ± 3.4	22 (20.25-23)	0.026
Jump - long jump	2.49 ± 0.11	2.48(2.46-2.56)	2.51 ± 0.12	2.49(2.47-2.56)	0.001
Technical procedures – basketball	4.95 ± 1.13	5 (4-6)	5.14 ± 1.12	5 (4-6)	0.046
Measurements – 2021-2022					
Speed – 50m	8.76 ± 0.62	8.9 (8.24-9.25)	8.64 ± 0.58	8.79 (8.14-9.05)	<0.001
Dorsal trunk lift	21.59 ± 3.32	21.5 (20-25)	22.32 ± 2.76	22.5 (20-25)	0.004
Trunk extension lying face down	22.68 ± 3.07	24 (20-25.25)	23.14 ± 2.62	24 (21.75-25.25)	0.019
Jump - long jump	2.59 ± 0.1	2.59 (2.5-2.66)	2.61 ± 0.11	2.63 (2.55-2.67)	0.016
Technical procedures – basketball	5.32 ± 1.13	5 (4.75-6)	5.91 ± 0.97	6 (5-7)	0.009

**Related-Samples Wilcoxon Signed Rank Test*

In Table 2, we present the comparison of the evolving parameters measured in the students of 6th grade. The distribution of the investigated parameters between the measurements was non-parametric according to the Shapiro-Wilk test ($p < 0.05$).

Table 2. Comparison of evolving parameters measured in 6th grade students

Parameter/Measurement		2020-2021	2021-2022
Initial testing– Speed running 50 m	Average±SD	9.26 ± 0.78	8.76 ± 0.62
	Median (IQR)	9.4 (8.62-9.86)	8.9 (8.24-9.25)
	p*	<0.001	
Final testing – Speed running 50 m	Average±SD	9.04 ± 0.67	8.64 ± 0.58
	Median (IQR)	9.32 (8.48-9.5)	8.79 (8.14-9.05)
	p*	0.001	
Initial testing – Trunk lift lying on the back	Average±SD	19 ± 3.42	21.59 ± 3.32
	Median (IQR)	19 (16-21.25)	21.5 (20-25)
	p*	0.001	
Final testing – Trunk lift lying on the back	Average±SD	19.5 ± 3.43	22.32 ± 2.76
	Median (IQR)	20 (16.75-22)	22.5 (20-25)
	p*	0.001	
Initial testing – Trunk lift lying face down	Average±SD	20.55 ± 3.66	22.68 ± 3.07
	Median (IQR)	20.5 (19.25-23)	24 (20-25.25)
	p*	0.029	
Final testing– Trunk lift lying face down	Average±SD	21.14 ± 3.4	23.14 ± 2.62
	Median (IQR)	22 (20.75-23)	24 (21.75-25.25)
	p*	0.019	
Initial testing – Long jump with moose	Average±SD	2.49 ± 0.11	2.59 ± 0.1
	Median (IQR)	2.48 (2.46-2.56)	2.59 (2.5-2.66)
	p*	0.001	
Final testing – Long jump with moose	Average±SD	2.51 ± 0.12	2.61 ± 0.11
	Median (IQR)	2.49 (2.47-2.56)	2.63 (2.55-2.67)
	p*	0.002	
Initial testing – Technical procedures isolated basketball	Average±SD	4.95 ± 1.13	5.32 ± 1.13
	Median (IQR)	5 (4-6)	5 (4.75-6)
	p*	0.011	
Final testing– Technical procedures isolated basketball	Average±SD	5.14 ± 1.12	5.91 ± 0.97
	Median (IQR)	5 (4-6)	6 (5-7)
	p*	0.003	

*Related-Samples Wilcoxon Signed Rank Test

According to the Wilcoxon tests, most of the parameters analyzed in the evolution were significantly different between the intervals ($p < 0.05$), so that:

- Initial and final 50m sprint values were significantly higher in 2020-2021 compared to 2021-2022 ($p < 0.001/p = 0.001$);
- The initial and final values for the force of raising the trunk from the supine position were significantly higher in 2021-2022 compared to 2020-2021 ($p = 0.001/p = 0.001$);
- The initial and final values for trunk lifting force from the face lying position were significantly higher in 2021-2022 compared to 2020-2021 ($p = 0.029/p = 0.019$);
- Initial and final long jump values were significantly higher in 2021-2022 compared to 2020-2021 ($p = 0.001/p = 0.002$);
- Initial and final values for isolated technical procedures score in basketball were significantly higher in 2021-2022 compared to 2020-2021 ($p = 0.011/p = 0.003$).

Discussion and Conclusions

By answering the two previous questions, this study highlighted the following aspects of the Pandemic influence on the motor capacity:

- The effects of the pandemic were felt unevenly by the students included in the study, depending on the living conditions of each one, also considering the situations in which the education program was online during 2020-2021 and then in 2021-2022 mainly with physical presence.
- During the pandemic period, due to the restrictions imposed, a decrease in the effort capacity of the students can be observed.

Based on the study conducted during 2019-2020, 2020-2021, 2021-2022, at Secondary School No. 27 on the group of students considered in the study in comparison with the results of similar studies carried out in different European countries published in the specialized literature presented above, it can be concluded that the pandemic, in a constant, comparable and similar manner, affected the effort capacity of the students.

Considering the results of the control tests in the next academic year, we will approach the motor capacity through curricular and extracurricular methods.

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