

## **Abstract**

In March 2020, when the new coronavirus SARS-CoV-2 spread across all over the world, causing acute respiratory distress syndrome, the World Health Organization declared COVID-19 a global pandemic. In response to the dynamic increase in the number of cases, governments around the world introduced restrictions aimed at preventing the further spread of the virus. As part of these actions, schools, as well as sports facilities were closed, and movement restrictions were introduced, indirectly causing, a decrease in physical activity levels, an increase of sedentary time, and screen time. The restrictions introduced caused unfavorable changes in body composition and motor fitness levels, which are key parameters in assessing the current and future health status and in preventing chronic diseases, particularly among young people. The aim of dissertation was to assess changes in body composition and physical fitness of school-aged children that occurred during the SARS-CoV-2 pandemic. This doctoral dissertation is based on the analysis of cross-sectional studies conducted among children and adolescents from Kraków in the years 2020 and 2022 (before and after the COVID-19 pandemic). The studies included randomly selected primary schools located in four main districts of the city of Kraków. The study group included children and adolescents aged 11–15 years. Consisted of a total of 590 participants in 2022 and 1,045 participants in 2020. For comparative analysis, the participants were divided according to age and sex, and the exact calendar age of each participant was calculated as the difference between the date of birth and the date of the examination, expressed as a decimal fraction. Selected anthropometric measurements were taken. Body composition was assessed using the bioelectrical impedance method. In addition, motor fitness was assessed using a modified EUROFIT test. All statistical analyses to compare differences between groups were conducted using the Statistica 13.3 software. The results of the research and their detailed interpretations were published in five thematically related scientific articles, constituting a complete analysis of body composition and motor fitness of the studied group. The analysis showed a statistically significant decrease in motor fitness levels in most fitness tests. Statistically significant differences were also noted in the measurements of skinfold thickness and higher values of body fat indicators among adolescents. Higher values of body mass index (BMI) and prevalence of overweight and obesity were also recorded, which were dependent on sex. On the other hand, the analysis of muscle mass results and body fat percentage did not show significant differences in the period before and after the COVID-19 pandemic. Additionally, an increase in hip circumference values was observed,

with a statistically significant difference depending on sex. On the other hand, not all research results showed a deterioration in body composition parameters. The study observed a significant increase in handgrip strength of both the right and left hand, as well as a decrease in waist circumference values in most age groups. The results of the conducted research indicate that the restrictions introduced by the government to prevent the spread of the SARS-CoV-2 virus had a negative impact on body composition and the motor fitness levels among children and adolescents from Kraków. Adverse changes in the analyzed parameters and motor tests may be related to reduced physical activity, prolonged sedentary time, and increased screen time. The improvement of some results may be due to physical activity at home or in the yard, or undertaken as restrictions were eased during the COVID-19 pandemic. Further research is needed to assess whether the restrictions introduced during the coronavirus pandemic will have a long-term negative impact on body composition and motor fitness in children and adolescents.