SUMMARY

**Assessment of the health status of school-aged children and adolescents considering selected environmental factors during the COVID-19 Pandemic**

**Introduction**. Following the World Health Organization’s declaration of the COVID-19 pandemic in 2020, all domains of life and social functioning experienced significant disruptions. The growing number of SARS-CoV-2 infections and deaths, together with the widespread imposition of lockdowns and accompanying restrictions, led to the pandemic being recognized as one of the most severe health crises of the 21st century. Children and adolescents were particularly vulnerable to the negative consequences of the COVID-19 pandemic. The pandemic and its related restrictions created considerable challenges for the physical, mental, and social well-being of children and adolescents. Evaluating this population segment during the pandemic provided valuable insights for designing and implementing health promotion initiatives, focused on nutrition, physical activity, rest, and mental work hygiene among students, and for more deliberate planning of the intervention measures, tailored to the specific health needs of the individuals and the population.

**The purpose of the study** was to assess the health status of school-aged children and adolescents, taking into account environmental factors during the COVID-19 pandemic.

**Material and methods.** The study took place from March 2021 to November 2022 and involved 414 primary school students from Sanok, born between 2007 and 2012. The largest proportion of the study group comprised students born in 2010 and 2012, while the least represented group was the students born in 2007. Within the respondent group, girls accounted for 52.17%, whereas boys represented 47.34%. Of the total students, 37.68% were enrolled in Year III, 29.23% in Year V, and 33.09% in Year VII. Among the respondents, 57.49% resided in rural areas, while the remaining 42.51% lived in urban settings. The study employed a diagnostic survey method and an analysis of the medical documentation. The research tools included an author-designed questionnaire, a scientific research protocol, a child body composition assessment form, and the IPAQ physical activity questionnaire. Statistical analyses were conducted using the 4.4.0 R software. The statistical significance was set at p < 0.05.

**Results.** Before the COVID-19 pandemic, the majority of students demonstrated a good state of health, with chronic illnesses (0.68%), injuries (1.71%), and hospitalizations (0.68%) occurring at low rates. The main health problems identified in the study group included an excessive body weight (the BMI of 44.20% of the students exceeded the 80th percentile) and postural defects, such as scapular asymmetry (10.39%) and hip asymmetry (3.62%), which necessitated monitoring and professional intervention. The most commonly reported complaints were headaches (10.92%) and abdominal pain (8.87%). Bioimpedance analysis of body composition conducted during the COVID-19 pandemic revealed a marked exacerbation of the pre-existing issue of excessive body weight. Among the various body types, obesity was the most common, affecting 37.44% of the students. Approximately 45.41% of the students were advised to pursue a moderate weight reduction of about 10 kilograms. A reduction of approximately 5 kilograms in body fat mass was recommended for 49.76% of the children. Selected behaviours related to nutrition, physical activity, leisure time, and daily rhythms varied according to sociodemographic factors such as year of birth, gender, place of residence, parental education, material conditions, and number of children in the family. The green vegetable consumption was significantly higher among girls (p = 0.035), while boys more often reported the daily consumption of afternoon snacks (69.39% vs. 58.80%; p = 0.001) and full-fat milk and soured cream (24.49% vs. 18.06%; p = 0.011). Engaging in outdoor physical activity for a duration of 1 to 2 hours per day was more frequent for children residing in urban areas (69.89%) than for those living in rural areas (60.08%; p = 0.036). The COVID-19 pandemic had a significant impact on children’s sleep patterns during school days (p<0.001). The proportion of children falling asleep between 10:00 p.m. and 11:00 p.m. increased from 10.87% to 22.71%, whereas the percentage of those falling asleep before 10:00 p.m. declined from 87.19% to 74.16%, thereby confirming a delay in sleep onset. The timing of sleep onset demonstrated statistically significant differences concerning both the year of birth (p < 0.001) and gender (p = 0.001). On school days, 38.10% of students born in 2007 reported falling asleep between 10:00 p.m. and 11:00 p.m. The majority of girls (71.30%) awoke between 6:00 and 7:00 a.m., whereas boys tended to wake later, primarily between 7:00 and 8:00 a.m. (43.88% vs. 27.31%). Relative to the pre-pandemic period, negative changes were observed in both health status and specific health-related behaviors. These changes concerned disruptions in daily rhythms, increased screen exposure time, and reduced time spent outdoors. In terms of sleep hygiene, the most frequently observed practices included ventilating the room before sleep (85.75%), avoiding caffeinated beverages (84.30%), and maintaining consistent wake-up times (83.09%), whereas the least commonly followed practice was limiting the use of blue light-emitting devices before bedtime (38.16%). Most students (64.25%) engaged in outdoor activities for 1-2 hours each day. A total of 26.09% spent 3-4 hours outdoors daily, while 6.28% did not engage in any active outdoor time. During the pandemic, the duration of electronic device use for educational purposes increased significantly. (p < 0.001). Nearly half of the children (47.10%) engaged in computer-based learning for 5 to 6 hours daily, while 21.01% studied for 7 to 8 hours per day. This represents a substantial increase compared to the pre-pandemic period, when the predominant duration of computer use for educational purposes was 1 to 2 hours (65.70%). The proportion of students using smartphones for learning increased from 7.97% to 21.01% (3-4 hours daily), and from 0.97% to 7.49% (5-6 hours daily). Despite parents believing that their children’s physical activity had decreased during this period, according to the IPAQ, the majority —71.74% — met the criteria for high physical activity, 27.29% for moderate activity, and only 0.97% were identified as having low levels of physical activity.

**Conclusions.** It is imperative to monitor the health status of children and adolescents, particularly during periods of public health crises. Assessing somatic parameters alongside lifestyle factors may enable the early identification of health issues and provide a foundation for designing preventive and educational interventions aimed at enhancing behaviors related to nutrition, body composition, circadian rhythms, physical activity, rest, and cognitive hygiene among students. Children exhibiting deficits in these areas should be provided with comprehensive support. Hence, it is appropriate to coordinate and integrate early prevention programs within educational settings. Interdisciplinary interventions tailored to the individual needs of children may significantly contribute to the improvement of health outcomes and overall quality of life in the pediatric school-age population.

**Keywords:** children, adolescents, environmental factors, health, COVID-19 pandemic.