

Evaluation of the BigO system during the COVID-19 outbreak in Greece

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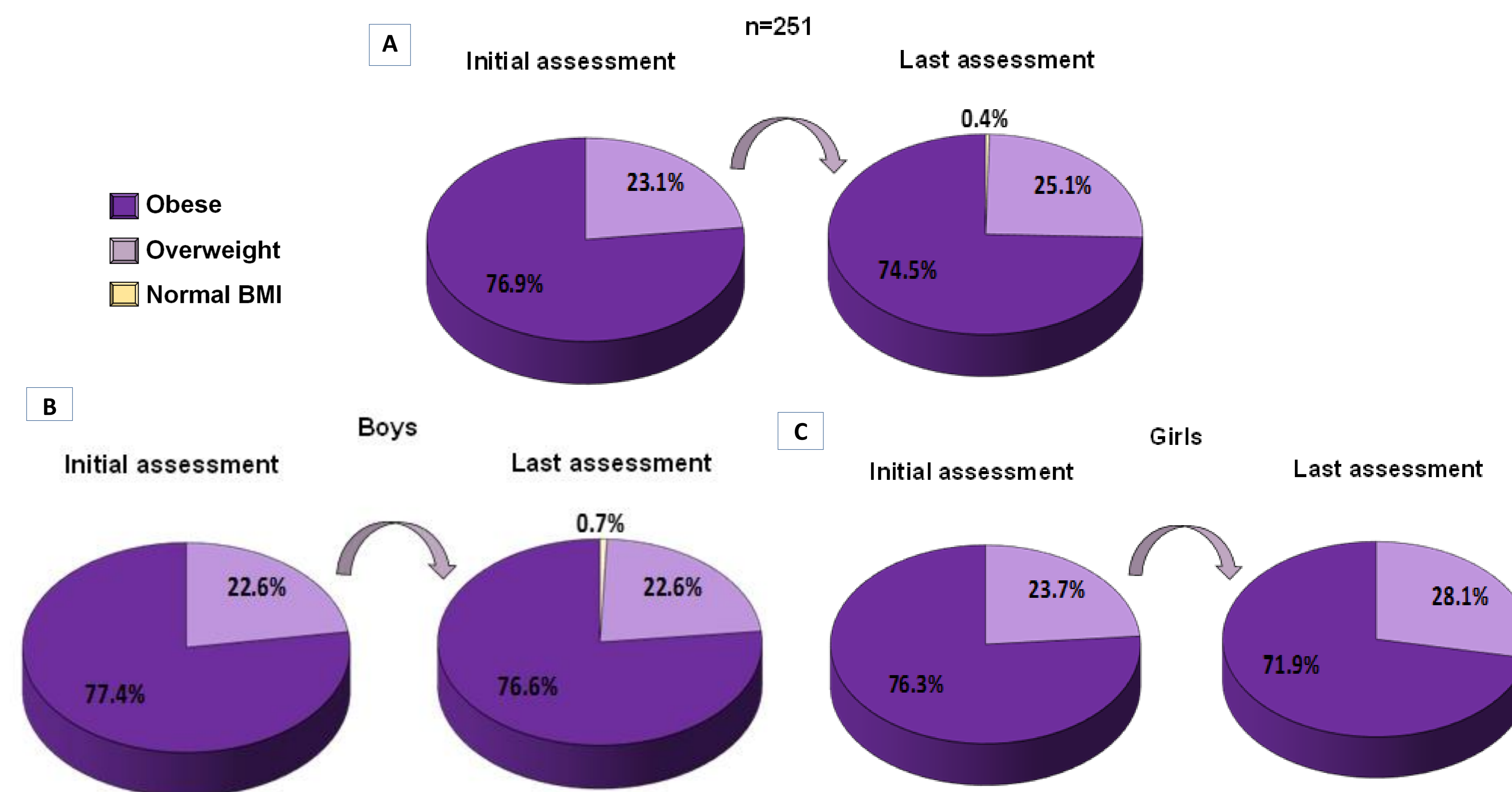


Background: Since December 2019, the world has witnessed a global pandemic due to SARS-CoV-2 coronavirus (COVID-19), which has led to lifestyle changes as a result of Public Health Regulations and Guidelines introduced by governments worldwide.

Objective: To determine the body mass index (BMI) trajectory in children and adolescents with overweight and obesity with respect to the COVID-19 outbreak in Greece.

Methodology: The study was carried out as part of the four-year European project BigO (<http://bigoprogram.eu>, Horizon2020, No. 727688). Overweight and obese children and adolescents aged 9-18 years participated in the study following approval by the local Committee on the Ethics of Human Research. Written informed consent was obtained by parents/guardians in all cases. The data collection system included the BigO technology platform, which interfaces with a Smartphone and Smartwatch, and records data objectively (using inertial sensors and GPS) for each patient. Participants used the BigO system for 4 weeks in order to take photographs of the food they consumed, as well as food advertisements, and wore the watch for specific periods during the week (at least 2 weekdays, 1 weekend and 3 nights). Subsequently, they entered a personalized lifestyle intervention program of diet, physical exercise and sleep for 3-4 months and used the system again for 4 weeks. For our analysis we have taken into consideration those patients that have participated from March 2020 until February 2021, who contributed data twice.

Results: The study population consisted of 251 children and adolescents (137 males, 114 females; mean age \pm SD: 12.786 \pm 2.559 years). At initial evaluation, the percentage of subjects with obesity was 76.9% and overweight 23.1%. A higher number of boys had obesity compared with girls (54.9% vs. 45.1%). Following the use of the BigO system twice, the proportion of subjects with obesity decreased by 3.1% (76.9% vs. 74.5%), while the proportion of overweight and normal-BMI subjects increased by 8.7% and 40%, respectively (23.1% vs. 25.1%, 0% vs. 0.4%). Similar changes were observed in both boys and girls. In general, BMI decreased by 1.4% (28.1 kg/m² vs 27.6 kg/m², $p < 0.001$) in all subjects.



Alteration in BMI at initial and last assessment of use of the BigO system and intervention during COVID-19 period (03/2020-2/2021): (A) in all subjects (n=251), (B) in boys, (C) in girls

Conclusions: These novel tools and interventions record the behavior of overweight and obese children and adolescents in an objective way. They were proven to be effective at managing childhood obesity despite the implications and lifestyle changes owing to the COVID-19 pandemic.

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