Evaluation of the BigO system in a clinical setting in Greece

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Background: Obesity in childhood and adolescence represents one of the most important public health problems. Over the last decade, the widespread use of personal digital technologies, such as smart mobiles and accelerometers, create new possibilities for collecting bevavioral data objectively.

Objective: To evaluate the body mass index (BMI) trajectory after at least one month's use of the BigO system.

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).

Results: The study population consisted of 857 children and adolescents (448 males, 409 females; mean age ± SD: 12.630 ± 2.466) who used the BigO system for at least one month. Subjects were classified as having obesity (n=665, 77.6%), overweight (n=187, 21.8%) or normal BMI (n=5, 0.6%) according to WHO cut-off points. At initial evaluation, the percentage of subjects with obesity was 77.6%, overweight 21.8% and normal BMI 0.6%. A higher number of boys had obesity compared with girls (54.1% vs. 45.9%), while a higher number of girls had overweight compared with boys (54.0% vs. 46.0%). Following at least one month's use of the BigO system, the proportion of obese subjects decreased by 3% (77.6% vs. 75.3%, p=0.002), while the proportion of overweight and normal-BMI subjects increased by 5% and 216%, respectively (21.8% vs. 22.9%, 0.6% vs. 1.9%, p=0.002). Similar changes were observed in both boys and girls. In general, the use of the BigO system for at least one month resulted in a decrease of BMI by 1.1% (28.2 kg/m^2 vs. 27.9 kg/m^2, p<0.001) in all subjects.
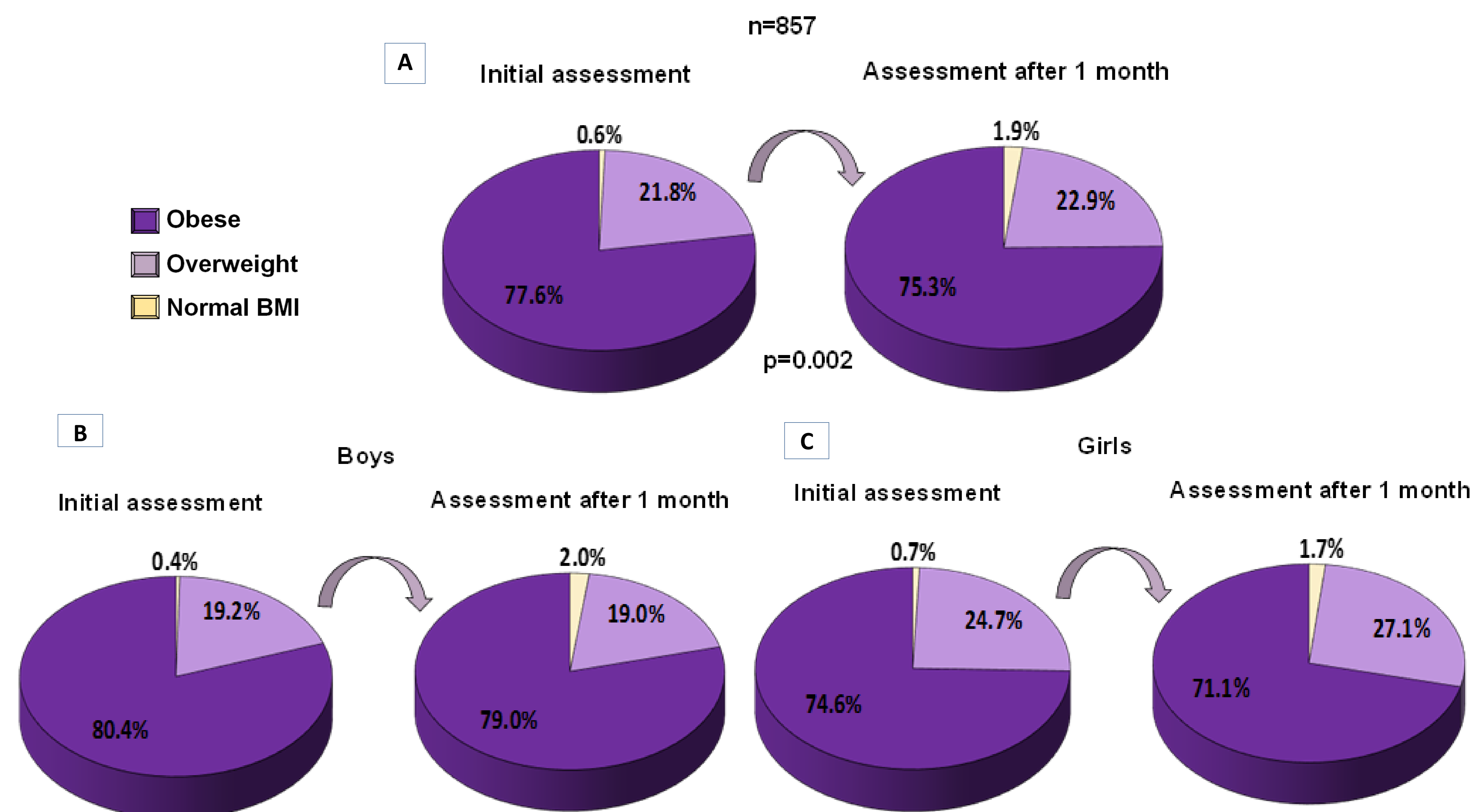
Alteration in BMI at initial assessment and after one month : (A) in all subjects (n=857), (B) in boys, (C) in girls

Conclusions: These novel tools and interventions record the behavior of overweight and obese children and adolescents objectively. Therefore, they may be useful at designing new public health policies in order to address the epidemic of childhood obesity effectively.