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Abstract

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BigO: Novel technologies for the management of childhood obesity – The case of a clinical study in Greece

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INTRODUCTION: Obesity represents one of the most challenging public health problems of the 21st century. According to the World Health Organization (WHO), there is a need to create reliable monitoring and behavioral systems, and to investigate their effectiveness in preventing childhood obesity. Our aim is to evaluate a range of novel technologies for collecting photographs, information regarding physical activity and geographic data (GPS) in overweight and obese children and adolescents during their day-to-day life. METHODS: 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 includes the BigO technology platform, which interfaces with a Smartphone and Smartwatch, and records data objectively (using inertial sensors and GPS) for each patient. Data are then transmitted to BigO servers to extract behavioral indicators, including: (a) physical activity/exercise, (b) dietary habits, and (c) environmental conditions (urban, socioeconomic, nutritional). During Phase 1, participants used the BigO system for 4 weeks 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). Finally, they were asked to return the watch and complete a user-experience questionnaire. RESULTS: Eight hundred and thirty seven patients (372 males, 378 females) participated in the study. The performed data collection included 87 out of 750 patients who contributed data twice (2x4 weeks of system use), once before and once after a 3-months intervention period (based on the clinical pilot conducted in Phase 0, the use of the BigO system in a clinical setting was assessed as a useful behavioural monitoring toolset for the monitoring of the progress of site-specific clinical interventions). All subjects uploaded a total of 17,987 meal photographs from their mobile camera and recorded 19,643 days of inertial sensor data from the smatphone or smartwatch (12,354 days of accelerometer data and 7,289 days of GPS data); 88% of the participants expressed a positive or neutral opinion when assessing the system. CONCLUSION: These novel tools and interventions record the behavior of overweight and obese children and adolescents in an objective way and provide information about their environment. Therefore, they may be useful at designing new public health policies and strategies in order to effectively address childhood obesity.

OBJECTIVES

Obesity represents one of the most challenging public health problems of the 21st century. According to the World Health Organization (WHO), there is a need to create reliable monitoring and behavioral systems, and to investigate their effectiveness in preventing childhood obesity. Our aim is to evaluate a range of novel technologies for collecting photographs, information regarding physical activity and geographic data (GPS) in overweight and obese children and adolescents

during their day-to-day life.

MATERIALS-METHODS

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 includes the BigO technology platform, which interfaces with a Smartphone and Smartwatch, and records data objectively (using inertial sensors and GPS) for each patient. Data are then transmitted to BigO servers to extract behavioral indicators, including: (a) physical activity/exercise, (b) dietary habits, and (c) environmental conditions (urban, socioeconomic, nutritional). During Phase 1, participants used the BigO system for 4 weeks 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). Finally, they were asked to return the watch and complete a user-experience questionnaire.

Figure 1. BigO Technology Platform: a) Decrease in weight and BMI, b) Photographs of foods consumed, c) The average physical activity per day per week
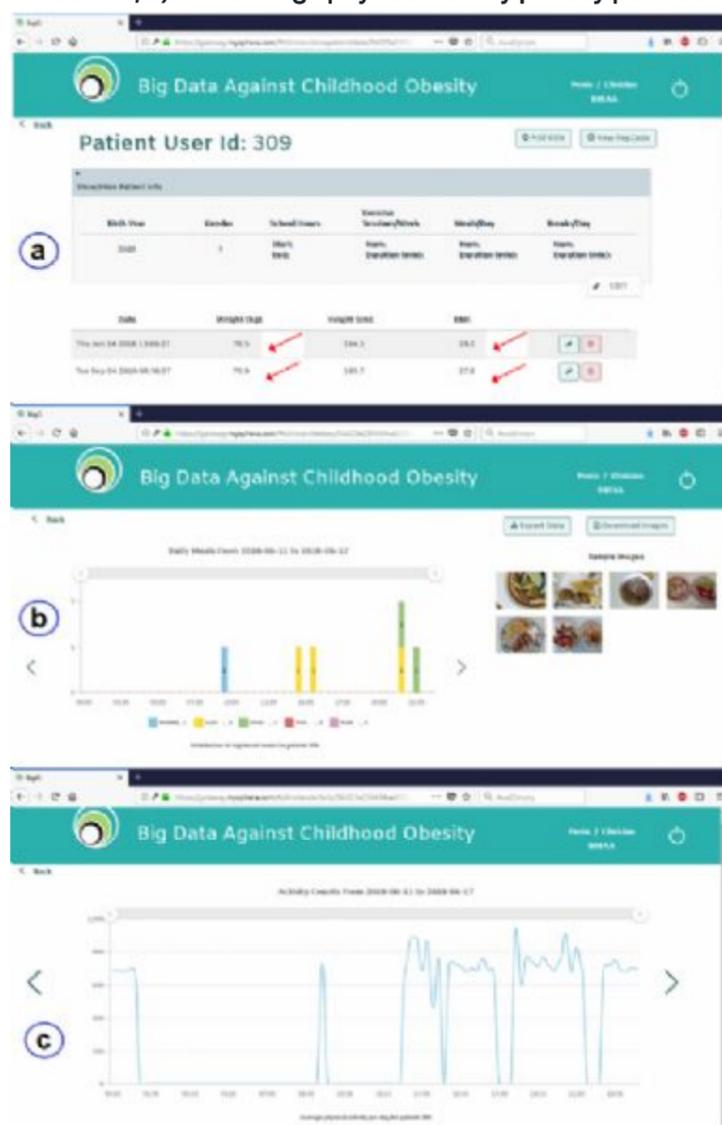
RESULTS

Eight hundred and thirty seven patients (372 males, 378 females) participated in the study. The performed data collection included 87 out of 750 patients who contributed data twice (2x4 weeks of system use), once before and once after a 3-months intervention period (based on the clinical pilot conducted in Phase 0, the use of the BigO system in a clinical setting was assessed as a useful behavioural monitoring toolset for the monitoring of the progress of site-specific clinical interventions). All subjects uploaded a total of 17,987 meal photographs from their mobile camera and recorded 19,643 days of inertial sensor data from the smartphone or smartwatch (12,354

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CONCLUSIONS

These novel tools and interventions record the behavior of overweight and obese children and adolescents in an objective way and provide information about their environment. Therefore, they may be useful at designing new public health policies and strategies in order to effectively address childhood obesity.

1. Conflict of Interest:

Authors have nothing to disclose

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Ask to Presenter

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