Project Acronym: NUTRISHIELD

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Digital interventions in the management of the body weight of children and adolescents

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Addressing excess weight in childhood and adolescence continues to be one of the most important public health challenges. The immediate need to tackle childhood obesity has led to significant growth in research into the effectiveness of the relevant interventions.

To date, various types of interventions have been tested, from programs in a school environment to integrated individualized behavioral programs carried out by a multidisciplinary team. With the boom in the use of technological means, new information gathering and communication tools can be useful tools for the development of "smart" digital health interventions, which could help tackle childhood obesity. Data collected through internet-connected systems, electronic health records recording clinical and demographic information, as well as smartphones and mobile devices that monitor eating behaviors, provide an opportunity to generate useful knowledge about users' health, behaviour and progress.

A scientific team from Harokopio University has recently published a systematic review and meta-analysis, in the framework of the Nutrishield* project, funded by the European Union (scientific coordinator for Harokopio University: Mr. Demosthenes Panagiotakos, Professor). The aim was to examine the impact of technology-based interventions to address overweight and obesity in children and adolescents. 8 randomised clinical trials were included with a total of 582 children (aged 9-12 years) and adolescents, with most involving adolescents. In 6 studies, technology-based interventions were compared with conventional interventions, while in the other 2 no intervention was applied in the control group. In 7 of the 8, however, a hybrid approach was followed, i.e. any technological tool that was examined in support of a conventional treatment. Similarly, 7 of the 8 studies included support from health professionals, e.g. dietitians, doctors, pediatricians and psychologists. The duration of the interventions ranged from 3 to 24 months. The individual results are presented below, by outcome parameter.

Parameters of body weight and fat

In 5 (63%) of the 8 studies, significant differences were found between the groups in body mass index parameters (BMI, BMI z score, BMI ectosteres). The duration of these

studies was over 6 months and parents were also involved in the intervention. Also, significant reductions were observed in the technology-based intervention groups in body fat percentage and waist/hip ratio when the interventions lasted 24 months.

Nutritional parameters

In 7 of the 8 studies, significant changes in at least one parameter of dietary intake and behaviour between groups were observed. In particular, the intervention group with digital means found greater adherence to a more balanced dietary pattern, increased consumption of fruits, reduced consumption of red meat, high-fat foods, fruit juices and sugar-containing beverages.

Physical activity parameters

Five of the 8 studies evaluated changes in participants' physical activity levels. One (20%) study showed a significant reduction in the time children and adolescents spend on screen, while the remaining 4 (80%) studies highlighted the increase in exercise intensity (in terms of hours/day).

Biochemical parameters and physical examination

In 1 of the 2 studies that evaluated biochemical parameters, a significant reduction in blood pressure and blood cholesterol levels of children and adolescents participating in the digital intervention was found.

Psychological health parameters

All studies presented data on psychological parameters. Of the 8 studies, 7 found that participants in the intervention group with the help of digital technology increased their self-efficacy in relation to diet and physical activity, improved their self-esteem and reduced unbalanced behaviors in relation to slimming diets, body weight and body image.

In conclusion, the meta-analysis showed that an intervention that combines conventional care with technological tools could be a more effective method for managing the body weight of overweight and obese children and adolescents, compared to conventional care alone. The technology used in the studies included interactive website platforms (e-Health, m-Health), mobile applications, games, sms text messages and other contact forms such as email, telemedicine and informational websites. The focus of these technologies was related to improving eating habits, enhancing physical activity and improving self-control. The type of technological means used in the interventions - via mobile phone or internet - did not seem to affect the final result. Parental involvement was associated with better results in the intervention, especially in children, and it was not possible to assess the individual contribution of

parents to the final outcome. Finally, the effectiveness of the interventions was evident when they lasted more than 6 months.

*NUTRISHIELD: EU funded H2020 project, Fact-based personalised nutrition for the young, https://nutrishield-project.eu/