

A positive parenting approach to childhood overweight and obesity:

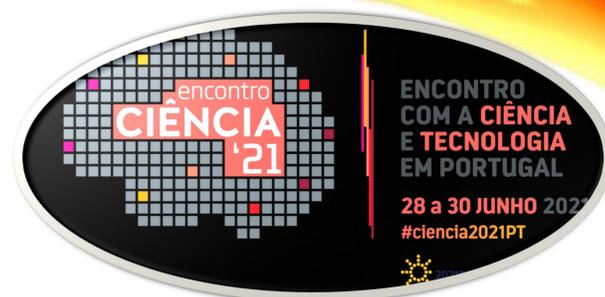
Long-term effects and underlying mechanisms of change of Group Lifestyle Triple P

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Introduction

- Childhood overweight and obesity (OW/OB) are highly prevalent conditions in Europe and worldwide that tend to continue through adulthood [1]. Portugal remains among the countries with a higher prevalence of childhood OW/OB across Europe (29.6%/12.0%, respectively) [2].
- Childhood OW/OB are associated with poor well-being and increased risk for physical and psychological health problems at short- and long-term across life-span [3].
- Multiple factors are contributing to children's weight gain, and the different sources of influence vary across developmental stages, with families playing a significant role at the earlier ages, when compared to other sources of influence [4]. Parenting practices (PP) are context-specific practices through which parents directly address children's behaviors [5].
- For children under the age of 12, family-based interventions combining behavioral strategies with feeding and physical activity (PA) components are effective in the management of childhood OW/OB [6]. Group Lifestyle Triple P (GLTP) is a parent-focused cognitive-behavioral intervention based on Social Learning Theory and active skills training strategies derived from the Triple P system, including 10 group sessions and 4 individual sessions covering positive parenting, nutrition, and PA topics to promote a healthy family lifestyle [7]. Parents learn, practice, and are encouraged to apply with their children and family multiple strategies regarding the three topics.
- To date, two Randomized Control Trials (RCT) assessed the efficacy of the GLTP, revealing promising results, namely: decrease in children's BMI z-score and child weight related problem behavior, less frequent use of ineffective parenting strategies, and increased parental self-efficacy, and additional decrease in BMI z-score at 12-months follow-up [8]; In addition, results allowed to identify short-term GLTP effects, including a decrease in soft drink consumption and in psychological control, and increases in the responsibility regarding PA and encouragement to eat, parental self-efficacy, and satisfaction with parenting [9]. The LifeStyle project (PTDC/SAU-NUT/30715/2017) studies the efficacy of GLTP among Portuguese Parents of OW/OB children through an ongoing RCT with 3 assessment time points (ATP; pre-, post-intervention, and 6-months follow-up) [10].
- Prior research stressed the effects of feeding and physical activity PP on children's weight status, mediated by children's food intake and PA, however, such findings are not consistent across studies [5]. Some studies suggest a bidirectional association between PA parenting practices and children's PA. However, longitudinal studies, using objective PA measures (accelerometry) and focusing on body composition (fat and lean mass) are needed [11-13] to further explore the bidirectional association.
- This study fills a gap in the study of the long-term effects of GLTP on children's outcomes (healthy behaviors and weight related outcomes) and parental outcomes (use of effective parenting practices to promote a healthier family lifestyle) and in the study of the mechanisms of efficacy of the program.

The purpose of the current research project is to evaluate the long-term effects of the GLTP, and the underlying mechanisms promoting changes in the families' lifestyle, using secondary data from the LifeStyle project (PTDC/SAU-NUT/30715/2017) and extending data collection until 12- and 18-months post-intervention.

Participants

- Parents of 120 OW/OB children aged 5-10 years old who participated in the LifeStyle project, followed in the Nutrition Unit of the Pediatric Department (NUPD) of the Centro Materno Infantil do Norte (CMIN).

Procedure

- Secondary data from the project LifeStyle (PTDC/SAU-NUT/30715/2017); extending data collection in 2 additional assessment time points (ATP): 12- and 18-months post-intervention (ATP4 and ATP5, respectively).
- LifeStyle project: a RCT with a parallel group study design, carried out in a single-center; participants randomly assigned to a control group (TAU) or to an intervention group (TAU plus GLTP) [10].
- GLTP: ten 90 minutes group sessions and four 20 minutes of individual remote sessions, over 17 weeks., delivered by two accredited practitioners [14].
- TAU: quarterly pediatric consultations at NUPD, aiming to foster healthy lifestyle habits and to prevent obesity related diseases, following the guidelines of the Committee on Nutrition of the European Society for Pediatric Gastroenterology Hepatology and Nutrition (ESPGHAN) [15].

Enrolment in the present study: At the last ATP of the LifeStyle project participants will be invited to integrate the current study; Participants sign a new informed consent; The participants allocated to the control condition will be given the opportunity to receive the GLTP intervention at the end of the LifeStyle project. As such, participants in the current study will integrate one of three groups:

- Experimental group [GLTP intervention and TAU]: participants allocated to the experimental group in the LifeStyle, that received GLTP intervention along with TAU at NUPD;
- TAU-only: participants that only received TAU and refused to receive GLTP intervention at the end of the LifeStyle project;
- TAU followed by GLTP: participants that received TAU-only during the LifeStyle project and that, after completing the 6-months follow-up assessment (ATP3), received the GLTP.

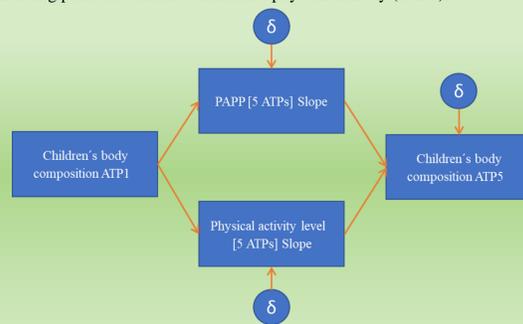
Instruments

- Child's anthropometric measures** - Height and weight, body composition - body fat percentage and muscle mass -, obtained through a body composition analyzer (Inbody 270) and a stadiometer. Collected during the pediatricians' appointments.
- Child's diet and energy consumption** (Parent's report): Feeding diary (FD; 1 weekend day and 2 weekdays) [16]; Food frequency questionnaire (FFQ) [17].
- Child's physical activity and sedentary behavior quality and quantification:** Accelerometer (ActiGraph GT3X; child use accelerometer for five consecutive days (including two weekend days)); Physical Activity Diary report (concomitant with accelerometer use; parent's report).
- Specific parenting practices related to child's physical activity encouragement and discouragement:** Physical Activity Parenting Practices (PAPP) [18] (Portuguese version: Canário, Cruz, & Abreu-Lima, 2018): Encouragement scale (single-factor Engagement and Structure) and Discouragement scale (3 factors: Promote Screen Time, Psychological Control, Restriction due to Safety Concerns).
- Specific parenting practices related to child's feeding:** Comprehensive Feeding Practices Questionnaire (CFPQ) [19] (Portuguese version: Canário, Cruz & Abreu-Lima, 2018). 9 Factors: Child control, Emotion regulation, Promotion of Healthy Eating, Food as reward, Involvement, Modeling, Monitoring, Pressure to eat, and Restriction.

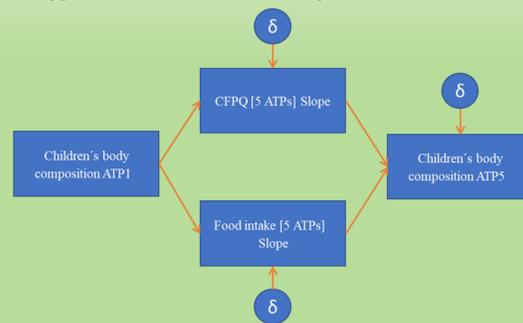
Studies and outcomes

- Study 1** assesses the long-term effects of GLTP on children's body composition, physical activity, food intake, and feeding and physical activity PP, across allocation conditions. Outcome measures:
 - Child's anthropometric and body composition measures;
 - Child's physical activity and sedentary activity levels (accelerometry) and quality (Physical Activity Diary report);
 - Children's food intake (FD, FFQ);
 - Parenting practices related to children's physical activity (PAPP) and feeding (CFPQ).

- Study 2** evaluates the direct and indirect effects of children's physical activity and related parenting practices on children's body composition over time, across allocation groups.
 - Child's anthropometric and body composition measures;
 - Child's physical activity and sedentary activity levels (accelerometry) and quality (Physical Activity Diary report);
 - Parenting practices related to children's physical activity (PAPP).



- Study 3** assesses the direct and indirect effects of children's food intake and feeding parenting practices on children's body composition over time, across allocation groups.
 - Child's anthropometric and body composition measures;
 - Children's food intake (FD, FFQ);
 - Parenting practices related to children's feeding (CFPQ).



- Study 4** explores parents' perceptions about changes in their family's lifestyle following GLTP. A qualitative research approach will be conducted with the implementation of a focus group. In order to implement it, a group of parents will be established, and it will be constituted by a subgroup of participants who received the intervention, and some questions considered relevant and complementary to the quantitative approach of the study will be explored, considering the number of sessions attended. An authorization will be requested to the participants for the audio recording of the session, and the collected data will be later transcribed and analyzed.

Data analysis

The outcome measure for children's BMI z-scores at each ATP will be computed using the OMS macro [20].

Individual growth curve models will be performed to evaluate the long-term effects of GLTP on children's body composition, physical activity, food intake, and feeding and physical activity parenting practices, across allocation conditions, using growth curve analysis, and comparing effects according to allocation conditions (study 1).

To assess the direct and indirect effects of children's food intake and physical activity on children's body composition over time (studies 2 and 3), mediation analysis will be performed using structural equation modeling addressing the effects of children's BMI z at ATP1 on children's BMI z at ATP5, and using the slopes of children's, physical activity, food intake, and feeding and physical activity parenting practices across the 5 time points as mediators.

Parents' perceptions about changes in their family's lifestyle following GLTP intervention (study 4) will be evaluated through thematic analysis following the framework by Braun and Clarke [21].

Implications

- For the scientific community, this study will be the first to provide knowledge on the long-term efficacy of the GLTP in several children outcomes (related to weight status, food intake, and sedentary and physical activity) and parental outcomes (parenting practices related to feeding and physical activity). The study will contribute to the development of a line of research regarding the assessment of the long-term efficacy of the GLTP, as well as for the study of the specific parenting practices related to feeding and physical activity that may mediate such long-term effects. The study will contribute to the existing literature on the GLTP efficacy, addressing the long-term effects as well as the processes through which the effects can occur. The outcomes of the study will provide policymakers, stakeholders, and practitioners with additional information about the benefits of the GLTP that will extend the existing literature related to the program efficacy. Practitioners will also benefit from a better understanding of the contribution of the specific parenting practices (and specific GLTP topics that can improve such practices) for the desired long-term outcomes. It is expected that these outcomes will contribute to encourage the practitioners' attention to implementation fidelity, a critical point for ensuring the program effectiveness.
- For the general community, it is important to have evidence-based interventions available targeting childhood OW/OB and evidence supporting the maintenance of the gains attained across-time following intervention. The present study will provide information regarding the maintenance of the weight-related outcomes in children, and parenting practices, including a larger follow-up period following the intervention, compared to previous studies.

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