INPLASY

Effectiveness of digital gamified interventions for the promotion of healthy behaviors in the prevention of childhood obesity: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - There has been no financial support received for the conduct of this research.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202630038

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 March 2026 and was last updated on 10 March 2026.

INTRODUCTION

Review question / Objective The objective of this systematic review is to evaluate the effectiveness of digital gamified interventions compared with non-gamified electronic health interventions, in improving health-related behaviors and reducing overweight or obesity among children aged 0–13 years at risk of, or diagnosed with, overweight or obesity. Specifically, the review will assess changes in dietary intake, physical activity, sedentary behavior, and anthropometric indicators.

Condition being studied Overweight and obesity in children aged 0-13 years.

METHODS

Search strategy A comprehensive literature search was conducted across four electronic databases: PubMed, Web of Science, Scopus, and LILACS, to identify randomized controlled trials (RCTs) published up to December 11th of 2025. The search strategy included the following terms, which were applied to both the title and abstract fields; Boolean operators (AND, OR) were utilized to refine the search:
"Pediatric Obesity"; "Childhood Obesity"; and "Childhood Overweight"
"Serious Games"; "Games"; "Digital games"; "Video games" Mobile Health""; and "eHealth";
"Healthy Lifestyle"; "Healthy Nutrition", "Eating behaviours", and "Dietary habits".

Participant or population The inclusion criteria required studies to be randomized controlled trials (RCTs) involving participants aged 0-13 years who were at risk of, or diagnosed with, overweight or obesity (according to the definitions used by the original study authors) and without preexisting severe chronic diseases.Studies targeting parents or primary caregivers of these children, as well as those addressing the entire family unit, were also included.

Intervention Interventions evaluating the effectiveness of digital gamified interventions, or

hybrid digital–in-person (digiphysical) strategies were eligible.

Comparator No digital gamification elements, standard care, or no intervention.

Study designs to be included Randomized Controlled Trials.

Eligibility criteria Eligibility was assessed using the PICOS framework (Participants, Interventions, Comparators, Outcomes, and Study design).
The inclusion criteria required studies to be randomized controlled trials (RCTs) involving participants aged 0-13 years who were at risk of, or diagnosed with, overweight or obesity (according to the definitions used by the original study authors) and without preexisting severe chronic diseases. Studies targeting parents or primary caregivers of these children, as well as those addressing the entire family unit, were also included. Interventions evaluating the effectiveness of digital gamified interventions, or hybrid digital–in-person (digiphysical) strategies were eligible. Studies were included only when the comparator arm involved no digital gamification elements. Primary outcomes: Changes in health-related behaviors, including (i) dietary intake of: fruit and vegetables (g/day), energy-dense foods (g/day), sugar-sweetened beverages (ml/day), total energy (kcal/day); (ii) physical activity (minutes/day); and (iii) sedentary behaviours, including screen time (minutes/day). Secondary outcomes: Changes in anthropometric indicators, including (i) body mass index (BMI).
Articles were excluded if (i) they were published in languages other than English or Spanish; (ii) they included both children and adolescents without age-stratified analyses, or focused on children with specific medical conditions; (iii) they did not involve digital gamified interventions, or if the game component was not the main element of the intervention; (iv) they reported only knowledge, perceptions, or attitudes without assessing changes in health-related behaviors or nutritional status; or (v) secondary analyses of RCTs that did not primarily assess intervention effectiveness.

Information sources Electronic databases.

Main outcome(s) Primary outcomes: Changes in health-related behaviors, including (i) dietary intake of: fruit and vegetables (g/day), energy-dense foods (g/day), sugar-sweetened beverages (ml/day), total energy (kcal/day); (ii) physical activity (minutes/day); and (iii) sedentary behaviours, including screen time (minutes/day). Secondary outcomes: Changes in anthropometric indicators, including (i) body mass index (BMI).

Quality assessment / Risk of bias analysis The risk of bias was assessed using the Cochrane risk-of-bias tool for randomized trials (RoB 2), which evaluates 5 domains: randomisation process, deviations from the intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Each domain was rated as low, high and some concerns risk.

Strategy of data synthesis The analysis was based on summary statistics (sample size, mean, and standard deviation) of change from baseline and follow-up for fruit, vegetable, and total energy intake.
Meta-analyses were conducted using Review Manager (RevMan, version 5.4.1; Cochrane Collaboration). Pooled effect estimates were calculated using a random-effects model to account for between-study variability. Effect sizes were expressed as standardized mean differences (SMD; intervention minus control) when different scales or units were used across studies. Summary estimates were presented with corresponding 95% confidence intervals (CI) and visualized using forest plots alongside a Z test. Statistical heterogeneity was assessed using Cochran's Q test and quantified using the I^2 statistic.

Subgroup analysis None.

Sensitivity analysis Funnel plots and sensitivity analyses were not performed due to the limited number of studies available for eachoutcome.

Language restriction Spanish and English.

Country(ies) involved Mexico.

Keywords Childhood Obesity, Serious Games, Digital Gamification, Healthy Lifestyle, Dietary Habits Physical Activity, Sedentary Behaviors.

Contributions of each author
Author 1 - JULIA OLIVARES MEDINA - The author conceived and formulated the research question, designed the study protocol, conducted the comprehensive literature search, performed data extraction and analysis, and wrote the entire manuscript. The author was responsible for identifying the problem, defining the objectives, and ensuring the methodological rigor of the systematic review.
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Author 2 - Víctor Manuel Mendoza Núñez - Providing methodological guidance throughout the review process. Specifically, the tutor assisted in confirming the eligibility of studies for inclusion, advised on the structure and formatting of the results tables, and guided the organization of information across the different sections of the systematic review.
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Author 3 - Berenice Palacios González - Reviewing the manuscript for clarity, coherence, and accuracy. Specifically, this author assisted in refining the writing style, improving the overall readability, and ensuring proper formatting across the different sections of the systematic review.
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