

## Pooled Analysis of Three School-Based Obesity Interventions in a Metropolitan Area of Brazil

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**Abstract :** Obesity is increasing at a fast rate in low and middle-income countries where few school-based obesity interventions have been conducted. Results of obesity prevention studies are still inconclusive mainly due to underestimation of sample size in cluster-randomized trials and overestimation of changes in body mass index (BMI). The pooled analysis in the present study overcomes these design problems by analyzing 4,448 students (mean age 11.7 years) from three randomized behavioral school-based interventions, conducted in public schools of the metropolitan area of Rio de Janeiro, Brazil. The three studies focused on encouraging students to change their drinking and eating habits over one school year, with monthly 1-h sessions in the classroom. Folders explaining the intervention program and suggesting the participation of the family, such as reducing the purchase of sodas were sent home. Classroom activities were delivered by research assistants in the first two interventions and by the regular teachers in the third one, except for culinary class aimed at developing cooking skills to increase healthy eating choices. The first intervention was conducted in 2005 with 1,140 fourth graders from 22 public schools; the second, with 644 fifth graders from 20 public schools in 2010; and the last one, with 2,743 fifth and sixth graders from 18 public schools in 2016. The result was a non-significant change in BMI after one school year of positive changes in dietary behaviors associated with obesity. Pooled intention-to-treat analysis using linear mixed models was used for the overall and subgroup analysis by BMI status, sex, and race. The estimated mean BMI changes were from 18.93 to 19.22 in the control group and from 18.89 to 19.19 in the intervention group; with a p-value of change over time of 0.94. Control and intervention groups were balanced at baseline. Subgroup analyses were statistically and clinically non-significant, except for the non-overweight/obese group with a 0.05 reduction of BMI comparing the intervention with control. In conclusion, this large pooled analysis showed a very small effect on BMI only in the normal weight students. The results are in line with many of the school-based initiatives that have been promising in relation to modifying behaviors associated with obesity but of no impact on excessive weight gain. Changes in BMI may require great changes in energy balance that are hard to achieve in primary prevention at school level.

**Keywords :** adolescents, obesity prevention, randomized controlled trials, school-based study

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