Effects of a (Poly)phenol-Rich Dietary Supplement on Anthropometric, Biochemical, and Inflammatory Parameters in Participants with Severe Obesity: A Randomized Controlled Trial

Severe obesity represents a serious health concern requiring urgent therapeutic intervention. (Poly)phenols have been suggested as potential agents for managing this condition by influencing energy metabolism and fat storage. This double-blind, placebo-controlled, randomised clinical trial aimed to evaluate whether adding a (poly)phenol-rich supplement to a hypocaloric diet can improve anthropometric, body composition, cardiometabolic and inflammatory outcomes in individuals with severe obesity. Thirty-seven adults eligible for bariatric surgery (94.4% female; mean age 44.3 ± 8.9 years) were recruited from Bellvitge University Hospital (Spain) and randomly assigned to receive either a (poly)phenol-rich supplement or a placebo, alongside a hypocaloric diet (≤1,200kcal/day) for 12 weeks. Data collection, including anthropometry, blood pressure, dietary intake, physical activity, lifestyle questionnaires, and biological samples, occurred at baseline, mid-intervention (6 weeks), and endpoint (12 weeks). The primary outcome was body weight; secondary outcomes included other anthropometric and body composition parameters, and cardiometabolic and inflammatory biomarkers. Baseline characteristics were comparable, except for energy intake, significantly higher in the control group (p=0.008). Capsule intake compliance exceeded 97% in both groups, along with a significant decrease in energy intake. Compared to baseline, both groups experienced significant reductions in body weight (control: -2.2 kg [95%CI: -3.7, -0.6]; intervention: -2.0 kg [-3.0, -1.1]) and body mass index (control: -0.9kg/m2 [-1.5, -0.3]; intervention: -0.8 kg/m2 [-1.2, -0.4]), while waist circumference only decreased significantly in the intervention group (-1.7 cm [-2.5, -1.0]). Most cardiometabolic and inflammatory biomarkers remained unchanged, except for adiponectin and tumor necrosis factor receptor 1, which significantly increased in the intervention group (2.7 µg/mL [1.6, 3.7] and 0.1 ng/mL [0.0, 0.2], respectively). However, the absence of significant group-by-time interaction effects suggests that the observed changes were primarily driven by reduced energy intake. To our knowledge, this is the first randomised clinical trial investigating the effects of (poly)phenol supplementation in severe obesity.