

Adding Gut Health Supplement Helped Kids With Obesity Lose More Weight

By Kristen Monaco

Small trial saw metabolic benefits with daily butyrate added to standard of care

Children with obesity saw therapeutic benefits with the addition of a daily oral butyrate supplement to standard of care, the randomized Butyrate Against Pediatric Obesity (BAPO) trial showed.

In an intention-to-treat analysis of 54 participants, supplementation with oral sodium butyrate 20 mg/kg body weight per day led to a higher rate of decreases of ≥ 0.25 SD scores for body mass index (BMI) compared with placebo at 6 months (96% vs 56%, $P < 0.01$), reported Roberto Berni Canani, MD, PhD, of the University of Naples in Italy, and colleagues.

This translated into a number needed to treat of only 2, the group noted in JAMA Network Open.

BMI dropped down to an average of 26.53 from a baseline of 29.55 in the butyrate group, while the placebo group only dropped down to 28.71 from a baseline of 29.47.

In the per-protocol analysis of 48 participants, several other significant metabolic benefits were seen in those taking butyrate compared with placebo:

- Waist circumference: -5.07 cm (95% CI -7.68 to -2.46)
- Insulin level: -5.41 $\mu\text{U/mL}$ (95% CI -10.49 to -0.34)
- Homeostatic model assessment of insulin resistance: -1.14 (95% CI -2.13 to -0.15)
- Ghrelin level: -47.89 $\mu\text{g/mL}$ (95% CI -91.80 to -3.98)
- MicroRNA221 relative expression: -2.17 (95% CI -3.35 to -0.99)
- Interleukin-6 level: -4.81 pg/mL (95% CI -7.74 to -1.88)

There were no differences in changes in serum glucose, cholesterol, LDL-C, HDL-C, and triglyceride levels seen between the butyrate and placebo groups.

All participants engaged in similar diets, with both groups cutting out around 500 calories per day by 6 months. Canani's group also noted a shift in macronutrient intake, marked by lower carb and fat intake but more grams of fiber per 1,000 calories consumed.

These benefits seen with butyrate can be traced back to its beneficial impact on the gut microbiome (GM), the researchers explained.

"Plant foods are fermented by GM to produce the antiobesogenic short-chain fatty acid butyrate," they wrote. "Although butyrate dietary intake could be increased by the consumption of dairy products, its main source is derived by GM fermentation of nondigestible carbohydrates."

"A low intake of dietary substrates for butyrate production and a low number of butyrate-producing bacteria may contribute to obesity," they added. "This evidence suggests the potential of butyrate for treating obesity."

Those in the butyrate group took up to 800 mg/day of sodium butyrate for 6 months, while the placebo group took cornstarch capsules. Both groups received standard-of-care treatment for pediatric obesity in Italy, which involved the Mediterranean diet using the reference of the Italian Society of Human Nutrition plus at least 60 minutes of daily aerobic activity paired with a reduction in sedentary behaviors.

There were a few drawbacks to butyrate supplementation, as two children reported mild nausea and headaches while taking it, though these symptoms dissipated over the first 4 weeks of the study.

"The lower adherence rate and higher frequency of mild adverse effects observed in patients treated with butyrate suggest that the unpleasant organoleptic features of this compound may limit its clinical application," Canani and colleagues noted, adding that the "development of new butyrate-based compounds free of these unpleasant features is advocated for a more effective therapeutic action of butyrate against pediatric obesity."

This study, conducted from November 2020 through December 2021, included 54 participants ages 5 to 17 (mean age 11, 57% girls) treated at the Tertiary Center for Pediatric Nutrition at the University of Naples. Median baseline BMI was 27.3 in the placebo group and 30.4 in the butyrate group.

Of note, four participants in the butyrate group didn't adhere to treatment versus only two in the placebo group.

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