Comprehensive clarification of statistical and data concerns on the effects of apple cider vinegar on weight loss

We sincerely appreciate the time and effort that the readers have taken to critically examine our study.[1] Constructive criticism is essential in advancing scientific knowledge, and we welcome this opportunity to address the points raised.

STATISTICAL METHODOLOGY

While we initially employed independent t-tests to compare group outcomes, we acknowledge the merits of employing more robust approaches such as analysis of covariance or linear mixed models for adjusting baseline differences. The choice of independent t-tests was based on the homogeneity of variances and sample sizes among the groups, which, according to Ruxton, is valid.[2] Furthermore, research suggests that in small sample sizes, the use of t-tests, especially when there is a balance between the groups, can still yield reliable results.[3]

Importantly, we emphasise that effect sizes are critical for determining practical significance. Sullivan and Feinn highlight that even when statistical significance is questioned, effect size and practical relevance can offer meaningful insights, especially in clinical trials.[4] The substantial weight loss observed in our study is not only statistically significant but also clinically meaningful. Additionally, the clinical importance of effect sizes in interventions like ours has been reinforced in recent work on nutritional trials.[5]

WEIGHT LOSS OUTCOMES AND BIOLOGICAL PLAUSIBILITY

We understand that the magnitude of our findings may appear larger than in previous studies. However, there is growing evidence demonstrating that vinegar, including apple cider vinegar (ACV), can significantly influence body weight, fat mass and metabolic markers such as blood glucose, insulin sensitivity and triglyceride levels.[6] These findings provide biological plausibility for our results, especially among participants with elevated body mass indexes (BMIs), who are more likely to benefit from metabolic interventions.

ACV's acetic acid improves fat metabolism by enhancing fat oxidation, inhibiting fat synthesis and increasing mitochondrial activity, contributing to weight reduction even without major lifestyle changes.[7] Thus, the metabolic impacts of acetic acid provide a clear mechanistic basis for the substantial reductions in body mass observed in our participants. This body of evidence contextualises our findings, illustrating why ACV might lead to substantial weight loss without major dietary or exercise changes.

DATA DISTRIBUTIONS

We recognise the critique regarding the distribution of our data. However, reconstruction techniques such as SPRITE (Sample Parameter Reconstruction via Iterative Techniques) are sensitive to assumptions and should not be viewed as definitive evidence of data irregularities.[8] In fact, data simulation models often result in variations that may not necessarily mirror the original dataset.[9]

It is important to note that while the observed distributions might appear peculiar, they may also reflect the characteristics of the population studied. Our age and BMI ranges were specifically selected to focus on obesity-related outcomes in young populations. Research on recruitment for clinical trials emphasises the importance of balancing external validity while studying narrower population cohorts.[10] Therefore, it is possible that our distributions reflect true population characteristics rather than irregularities.

DATA AVAILABILITY

Ethical considerations regarding participant privacy and the data's involvement in ongoing studies have restricted our ability to share raw data directly. However, we have provided anonymised datasets to the journal for confidential review, ensuring the integrity of our ongoing research. We remain fully committed to transparency and are open to any further inquiries or clarifications needed in collaboration with the journal.

CONCLUSION

In summary, we assert that the methodologies employed in our study were appropriate and supported by existing literature. The findings regarding the effects of ACV on weight loss are both statistically and clinically significant. We appreciate the opportunity to address these concerns and are dedicated to contributing valuable insights to the field of nutrition and public health.

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