



Limitations of Self-reported Health Status and Metabolic Markers among Adults Consuming a “Carnivore Diet”

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Dear Editor:

We read with interest the publication by Lennerz et al. (1), which aimed to provide “descriptive data on the nutritional practices and health status of a large group of carnivore diet consumers.” Indeed, high-quality research into the effects of this dietary pattern should be welcomed as, in agreement with the authors, little is known about the health status of people habitually following a carnivore eating pattern.

We understand the significant challenges the coronavirus disease 2019 (COVID-19) pandemic has placed on research and how this may have necessitated the reliance on survey-based methodologies. Online surveys may be adequate for evaluating satisfaction/acceptance of a given diet and potentially highlighting adverse effects. However, such methodology opens the door for considerable bias when trying to characterize dietary habits, describe health status and changes in said status, and assess nutritional deficiencies (2).

The authors highlighted that there are no validated instruments to assess food frequency on such a carnivore diet. However, the stated characteristics of the “carnivore diet” are an exclusively meat- and animal-based diet that eliminates most, or all, plant-based foods. Existing validated food-frequency questionnaires (FFQs) have shown good correlation coefficients between red meat consumption from FFQs and reference validation instruments across diverse populations (3–5). Any number of existing FFQs can be found at the Dietary Assessment Validation/Calibration Register maintained by the National Cancer Institute (6). We contend that the lack of “carnivore diet”-specific dietary assessment instruments did not preclude the use of validated food-frequency instruments that exhibit good correlations with animal meat intakes (3–5). The speculative methods used in the present study, such as the unvalidated modified Likert scales, should be treated with caution.

The data provided in relation to change in health status should also be interpreted with caution, primarily due to their unverified nature since beginning this dietary pattern. In more extensive epidemiological studies, such health status is normally verified through an interview by a trained interviewer or access to participant medical records (7). This is to confirm the specificity and accuracy of the participant’s medical history details and ensure that they are true. No such verification was performed in this study, meaning that participants could, in theory, provide any information they wished, regardless of accuracy or integrity. It may also be considered dubious that participants would be able to accurately assess the presence or absence of

nutritional deficiencies considering the possibility of subclinical manifestation, regardless of how likely they would or would not be expected to occur.

Furthermore, and of most concern, is the inclusion of self-reported data related to metabolic markers such as blood lipids. It is irregular for a study to include such data, which is, as previously mentioned, unverified and also subject to reporting bias, as will be discussed in the following paragraphs. In addition, we consider it highly unusual that such data would pass rigorous peer review due to their unverified nature, particularly the inconsistency in the use of current and pre-diet values. Given the selection bias inherent in the inclusion of adherents to a very specific dietary pattern, the lack of verified biomarker data should also be treated with caution and are of dubious scientific validity.

A further consideration is that those recruited (i.e., those who identify as followers of the carnivore diet) may have multiple other health behaviors that differentiate them from the general population, making generalization of any inferences from this study more difficult. Behavioral research posits that the more one self-identifies, for example, as a healthy person or a follower of a specific diet, the more likely one is to participate in other health-related behaviors (8). This may lead followers of specific diets to engage in other behaviors they deem to be healthy, such as regular exercise and stable sleep patterns, among many others, which may also have considerable effects on health markers and overall health status.

In recent years, research has noted the development of information and ideological echo chambers, segregated communities of online social media platforms, where individuals share a common interest or viewpoint and have little exposure to opposing views (9). While efficient, recruiting participants from such groups may increase the likelihood of information gerrymandering, whereby a small number of zealots may influence others’ biased survey response outcomes (10). Indeed, as noted by the authors in the study limitations, selection bias for adults adhering to the carnivore diet may have led to selection of a particular subpopulation with high levels of affinity for the diet. It cannot be ruled out that such information gerrymandering did not occur in this study (intentionally or otherwise), leading to an increased likelihood of responses intended to paint this eating pattern in a positive light.

Of further concern is the number ($n = 28$) of duplicate survey responses identified by e-mail addresses, highlighting the risk of unverified respondents completing a survey multiple times (11). Considering

the aforementioned ideological echo chambers and desire to promote certain viewpoints, it may be speculated that specific individuals could complete the survey multiple times using alternate e-mail addresses. While this “stakeholder bias” is a potential concern for all such online survey-based research (11), it may be of particular concern among individuals aligned with specific dietary ideologies.

The authors are aware of many of the limitations of their study design and the generalizability of the results. It is also abundantly clear that higher-quality research is required to determine the carnivore diet’s long-term positive and adverse health effects. However, considering the propensity of media outlets and the lay public to misinterpret, exaggerate, and disseminate findings from scientific research, we believe caution should be exercised when discussing the study’s conclusions. In particular, discussion relating to the changes in health status and metabolic markers recorded in this study requires considerable reference to the unverifiable nature of the data.

We congratulate the authors on taking the first steps towards scientifically quantifying the health effects of the carnivore diet and welcome any future, high-quality studies that may provide valuable data to fill the sparse literature on this specific eating pattern.

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The authors report no conflicts of interest.

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