Proceedings of the Nutrition Society

cambridge.org/pns

The 49th Annual Scientific Meeting of the Nutrition Society of Australia, 3-5 December 2025

Cite this article: Mekonnen TC, Abebe Z, Dessie AM, Tegegne T, Shi Z, Eckert D, Adams R, and Melaku Y (2026). Mind the methods: uncovering quantitative shortcomings in ultra-processed food research. *Proceedings of the Nutrition Society* **85**(OCE2): E157. doi: 10.1017/S0029665126103978

Mind the methods: uncovering quantitative shortcomings in ultra-processed food research

T.C. Mekonnen[1], Z. Abebe[1], A.M. Dessie[1], T. Tegegne[2], Z. Shi[3], D. Eckert[1], R. Adams[1] and Y. Melaku[1]

[1]Flinders Health and Medical Research Institute, Flinders University, Adelaide; [2]Institute of Physical Activity and Nutrition, Deakin University, Melbourne and [3]Nutrition Science Department, Qatar University, Doha

Ultra-processed food (UPF) consumption has been linked to increased cardiovascular disease (CVD) risk; however, methodological inconsistencies across studies may limit the robustness and comparability of findings[1,2]. This systematic review synthesised and critically appraised quantitative approaches used to assess UPF–CVD associations. Following dual independent screening of 13,055 records, 45 unique studies published between 2017 and January 2025 were included: 42 prospective cohort studies, two modelling studies, and one controlled quasi-experimental intervention, encompassing n = 4,332,932 adults aged 18–79 years from all inhabited continents. Data were extracted on study characteristics, dietary assessment methods, UPF classification systems, outcome definitions, statistical modelling, and strategies for confounding control. Most studies (69.6%) assessed dietary intake via validated food frequency questionnaires (FFQs), 28.3% via 24-hour recalls, and one used both; validity was unreported in three studies. Over half (51%) measured intake only at baseline. All studies applied the NOVA classification system, yet only 26% reported the number and/or profession of those classifying foods. UPF exposure metrics varied—grams, kcal, servings, frequency per day—with inconsistent inclusion of alcohol and unreported handling of water intake in weight-based estimates. UPF subgroup definitions lacked standardisation, with moderate inter-rater agreement in some datasets (e.g., 65% in Iranian cohorts) despite identical data sources. Outcome ascertainment was heterogeneous: 32 studies examined overall CVD, with variation in inclusion of fatal and non-fatal events. Most outcomes were registry-linked (67%), while others relied on self-report or investigator-defined criteria. Cox proportional hazards regression predominated (80%), followed by Poisson and logistic regression; only one study applied causal inference methods in the main analysis. Although 73% conducted sensitivity analyses, many adjusted for potential mediators such as BMI, diet quality, or baseline hypertension, which may introduce collider bias. Across studies, higher UPF intake was generally associated with increased CVD risk; however, pooled estimates were inconsistent even when studies were clustered by similar population, exposure metric, and outcome definitions. Such inconsistencies appeared partly attributable to differences in dietary assessment frequency, exposure categorisation, and classification of specific UPF items. Variability in exposure metrics and handling of key covariates further contributed to heterogeneity in risk estimates. These findings highlight persistent methodological shortcomings in UPF–CVD research, including inconsistent measurement and classification practices, infrequent repeated dietary assessments, limited transparency in classification procedures, and rare application of causal inference approaches. Addressing these gaps through standardised dietary assessment protocols, harmonised UPF classification systems, and robust analytical frameworks is essential to improve comparability, strengthen causal inference, and inform targeted public health recommendations aimed at reducing UPF consumption and associated CVD risk.

References

1. Monteiro CA, Cannon G, Levy RB, *et al.* (2019) *Public Health Nutr* **22**(5), 936–941.
2. Lane MM, Gamage E, Du S, *et al.* (2024) *BMJ* **384**, e077310.

© The Author(s), 2026. Published by Cambridge University Press on behalf of The Nutrition Society.