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Ultra-processed food risk of cardiovascular events

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data extraction.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 June 2026 and was last updated on 25 June 2026.

INTRODUCTION

Review question / Objective What is the dose-response relationship between the level of ultra-processed food
intake (measured as percentage of total energy intake or grams per day) and the
risk of cardiovascular events (including coronary heart disease, myocardial
infarction, stroke, and cardiovascular death) in general adult populations?

Condition being studied Cardiovascular events (CVD events) refer to a group of acute and chronic clinical outcomes affecting the heart and blood vessels. In the context of this meta-analysis, the primary conditions of interest include:
The outcomes were CVEs (including the morbidity and mortality of CVD), or the risk of stroke and coronary heart disease (CHD); (4) the study design was a prospective cohort
Public health relevance
Cardiovascular diseases are the leading cause of global mortality and disability, accounting for approximately 17.9 million deaths annually (WHO). Diet is a major modifiable risk factor. While established dietary guidelines focus on nutrients (e.g., saturated fat, sodium, sugar), emerging evidence suggests that ultra-processed food (UPF) consumption – independent of traditional nutrient profiles – may increase CVD risk through mechanisms such as chronic inflammation, gut dysbiosis, rapid digestibility, and exposure to food additives or neoformed contaminants.
Therefore, this systematic review and dose-response meta-analysis will quantify how increasing levels of UPF intake relate to the incidence or mortality of cardiovascular events in general adult populations.

METHODS

Participant or population (1) general participants ≥18 years; (2) exposure is UPF consumption, and the original
paper had classified food according to the Nova system.

Intervention Exposure is UPF consumption, and the original paper had classified food according to the Nova system.

Comparator The study provided relative risks (RRs) or hazard ratios (HRs) with 95% confidence intervals (CIs), and/or sufficient data to derive these. Studies were excluded if they were abstracts, reviews, comments, letters, and/or editorials.

Study designs to be included The study design was a prospective cohort.

Eligibility criteria (1) general participants ≥18 years; (2) exposure is UPF consumption, and the original paper had classified food according to the Nova system; (3) the outcomes were CVEs (including the morbidity and mortality of CVD), or the risk of stroke and coronary heart disease (CHD); (4) the study design was a prospective cohort; (5) the study provided relative risks (RRs) or hazard ratios (HRs) with 95% confidence intervals (CIs), and/or sufficient data to derive these. Studies were excluded if they were abstracts, reviews, comments, letters, and/or editorials.

Information sources PubMed, EMBASE, Web of Science, and Cochrane Library.

Main outcome(s) UPF consumption and risk of CVEs.

Quality assessment / Risk of bias analysis The quality of the articles included was assessed using the Newcastle-Ottawa Scale (NOS).

Strategy of data synthesis Our study also performed stratified analyses by evaluation of stroke and CHD as the outcome. Sensitivity analysis was performed by omitting one study at a time to examine the stability of results and the potential sources of heterogeneity. Publication bias was assessed by the visual inspection of funnel plots, formal testing by Egger's regression asymmetry, and Begg's rank correlation tests, with the results considered significant at $P < 0.05$. The trim-and-fill method was used to correct the results if publication bias was detected.

Subgroup analysis Not Applicable.

Sensitivity analysis Sensitivity analysis was performed by omitting one study at a time to examine the stability of results and the potential sources ofheterogeneity.

Country(ies) involved China.

Keywords Ultra-processed food; Cardiovascular events; Meta-analysis; Dose-response.

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