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Consumption of Ultra-Processed Foods and Its Association with Increased Obesity Risk: A Recent Literature Review

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Abstract

Background: The global increase in ultra-processed food (UPF) consumption has been strongly linked to rising obesity rates. UPFs are typically high in calories, sugar, unhealthy fats, and additives, while lacking fiber and essential nutrients. Methods: This narrative literature review examined studies published between 2015 and 2025 in PubMed, Scopus, and Google Scholar. Eligible articles included observational and interventional research assessing UPF consumption and outcomes related to obesity, including body mass index (BMI) and waist circumference. Results: Twenty studies met the inclusion criteria. Findings from randomized trials, prospective cohorts, and meta-analyses consistently showed that high UPF intake is associated with increased calorie consumption, weight gain, higher BMI, central adiposity, and obesity prevalence across age groups. A dose–response relationship was evident, with greater UPF consumption linked to more adverse outcomes. Proposed mechanisms include excessive energy intake, poor satiety regulation, and metabolic dysfunction. Despite some heterogeneity, the evidence strongly supports UPFs as a major dietary contributor to obesity. Conclusion: UPF consumption is a significant driver of obesity and related metabolic disorders. Recommendations: Public health strategies should prioritize reducing UPF intake through taxation, front-of-pack labeling, marketing restrictions, nutrition education, and clinical counseling. Further research should assess long-term impacts of such interventions on population health

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Introduction

Obesity has emerged as one of the most pressing global health challenges of the 21st century. According to the World Health Organization (WHO, 2022), the worldwide prevalence of obesity has nearly tripled since 1975, with more than 650 million adults classified as obese in 2016. This trend is particularly concerning given the well-documented associations between obesity and a wide range of chronic diseases, including type 2 diabetes mellitus, cardiovascular disease, hypertension, and several types of cancer. Beyond physical health, obesity is also associated with reduced quality of life and imposes a considerable economic burden on healthcare systems worldwide (Hruby & Hu, 2015). Such alarming statistics highlight the urgency of identifying modifiable lifestyle and dietary factors that may contribute to the rising prevalence of obesity.

In recent years, ultra-processed foods (UPFs) have received increasing attention as a potential driver of the global obesity epidemic. UPFs, as defined by the NOVA classification, are industrial formulations typically containing multiple ingredients, including added sugars, hydrogenated oils, refined carbohydrates, flavor enhancers, preservatives, and cosmetic additives (Monteiro et al., 2019). Their high palatability, affordability, and convenience make them widely consumed across diverse populations. Several observational studies and meta-analyses have consistently linked UPF consumption to adverse health outcomes, including metabolic syndrome, cardiovascular diseases, and most notably, obesity (Moradi et al., 2023; Vitale et al., 2024). Evidence indicates that UPFs are not only energy-dense and nutrient-poor but also disrupt appetite regulation, promote excessive caloric intake, and contribute to metabolic dysfunction (Hall et al., 2019).

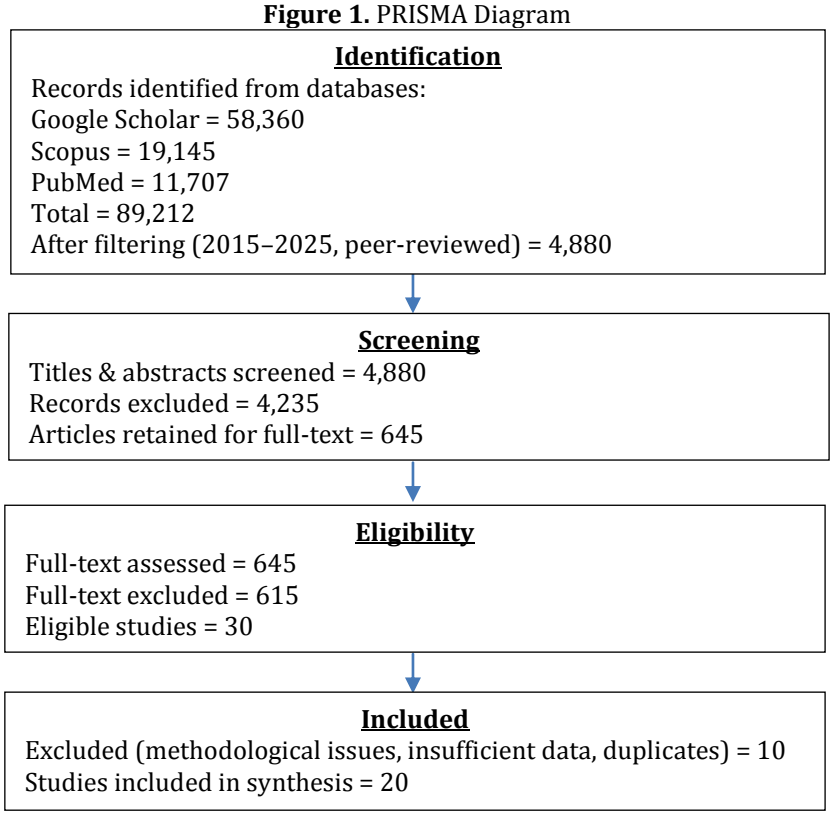
Despite the growing body of evidence, significant research gaps remain. Most existing studies are observational in nature, making it difficult to establish causal relationships. Furthermore, findings have varied across countries, age groups, and socioeconomic strata, suggesting that the impact of UPFs may be context-dependent. Intervention studies are still limited, and few have investigated long-term outcomes beyond weight gain, such as fat distribution, metabolic markers, or obesity-related comorbidities. Moreover, the role of public health policies such as food labeling regulations, taxation, or product reformulation strategies has not been adequately explored. Addressing these gaps is essential to achieve a deeper understanding of the role of UPFs in obesity development and to design effective, evidence-based interventions. Therefore, this review aims to synthesize findings from both observational and interventional studies conducted over the past decade, critically evaluate the strength of the association between UPF consumption and obesity, and highlight the implications for public health policy and preventive strategies.

Methods

This study applied a narrative literature review approach to examine the association between ultra-processed food (UPF) consumption and obesity risk, guided by the research question: "What is the strength and consistency of the association between UPF consumption and obesity risk across different population groups?" A systematic search was conducted in PubMed, Scopus, and Google Scholar using the keywords "ultra-processed foods," "obesity," "body mass index," "dietary patterns," "public health," "nutrition," and "childhood obesity." The search was limited to peer-reviewed articles published between January 2015 and June 2025 in English or Indonesian.

Eligible studies included observational (cohort, cross-sectional, or case-control) and interventional designs involving children, adolescents, or adults, with full-text availability. Non-scientific publications, editorials, reviews without primary data, commentaries, and animal or in vitro studies were excluded. Article selection followed four stages: identification, screening, eligibility, and inclusion. From each study, data were extracted on design, population characteristics, UPF assessment, and obesity-related outcomes. These were then narratively synthesized to evaluate the consistency and strength of associations between UPF consumption and obesity risk.

Figure 1. PRISMA Diagram



Results

The systematic search using the keywords "ultra-processed foods", "obesity", "body mass index", and "dietary intake" initially yielded a total of 89,212 publications (Google Scholar: 58,360; Scopus: 19,145; PubMed: 11,707). After applying filters to restrict the results to the past ten years (2015–2025) and peer-reviewed journal articles, the number was reduced to 4,880. Titles and abstracts were then

screened to identify studies that directly examined the relationship between ultra-processed food (UPF) consumption and obesity or anthropometric indicators such as BMI and waist circumference. This process narrowed the selection to 645 articles.

Further assessment was conducted to ensure that studies met at least one of the following inclusion criteria: (1) observational or interventional research design, (2) clear measurement of UPF consumption, and (3) reported outcomes related to overweight or obesity. Articles lacking methodological clarity, focusing on non-human subjects, or not reporting obesity-related outcomes were excluded.

Ultimately, 30 studies fulfilled all inclusion criteria. Following the exclusion of 10 studies due to methodological inconsistencies, insufficient data, or duplicated content, a final total of 20 articles were deemed eligible for analysis and synthesis (Table 1). These studies formed the basis for the discussion on the association between UPF consumption and obesity across various population groups.

Table 1. Articles Collected

Yes	Title & Year	Sample	Method	Result
1	Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain... (Hall et al., 2019)	20 adults (~31 yrs)	Crossover	Consumption of ultra-processed foods (UPF) freely was associated with an increase in calorie intake of about 500 kcal per day and a weight gain of about 0.9 kg within 2 weeks.
2	Ultra-processed food intake and metabolic phenotypes... (Farzam et al., 2024)	203 Iranian teenagers	Cross-sectional	Each additional consumption of 10 grams of ultra-processed foods per day increases the risk of metabolically unhealthy obesity (MUO) by 12% to 14%.
3	Ultra-processed food consumption in early childhood... (Zancheta et al., 2024)	962 Chilean children	Prospective cohort	Increased consumption of ultra-processed foods (UPFs) is associated with increased body fat (adiposity), which is reflected through an increase in the z-score of growth indicators indicating overweight or obesity in the young-age population.
4	Contribution of ultra-processed foods in visceral fat deposition and other adiposity indicators: Prospective analysis nested in the PREDIMEDPlus trial (Konieczna et al., 2021)	1485 adults (55–75 yrs)	Prospective cohort	Any 10% daily increase in energy from UPF was associated with visceral fat accumulation (β 0.09 zscore; 95% CI 0.05–0.13), android/ginoid ratio (β 0.05; 0.00–0.09), and total fat mass (β 0.09; 0.06–0.13)
5	Frontiers: UPF consumption... Brazilian women (Rudakoff et al., 2022)	1,021 adults	Prospective cohort	High consumption of UPF can cause an imbalance in body composition, i.e. body fat increases, while muscle mass and healthy tissue decrease.
6	The Results of UPF Consumption on Weight Change... (Lopes et al., 2025)	400 Brazilian adults	Community RCTs	Very high consumption of UPF was associated with weight gain of almost half a kilogram, in the period observed
7	Ultra-Processed Food Consumption Is Associated with Abdominal Obesity... (Sandoval-insausti et al., 2020)	1,500 elderly	Prospective cohort	Any 10% increase in total daily energy intake derived from ultra-processed foods (UPFs) is associated with an increase in central obesity

Yes	Title & Year	Sample	Method	Result
8	Ultra-Processed Food Consumption and Its Association with Risk of Obesity (MachadoRodrigues et al., 2024)	245 Portuguese teens	Cross-sectional	There are indications that UPF intake may increase the risk of being overweight, although the statistical evidence is still weak or not significantly strong (p is around 0.06).
9	Association Between Ultra-Processed Food Consumption and Metabolic Disorders in Children and Adolescents with Obesity (Lee et al., 2024)	149 Korean children & adolescents (BMI ≥85 percent	Cross-sectional	The highest UPF consumption → insulin resistance (+30 % odds), and the risk of MASLD (+37 %)
10	Consumption of ultra-processed foods and body fat distribution among U.S. adults (Liu et al., 2023)	9,640 U.S. adults	Cross-sectional	UPF highest quintile >72 % energy: total body fat +1.60 %, android fat +2.08 %, gynoid fat +1.32 % vs lowest (<39 %)
11	Ultra-processed food consumption is associated with increase in fat mass and decrease in lean mass in Brazilian women (Rudakoff et al., 2022)	1,021 Brazilian adult women	Cohort	UPF consumption ↑ proportion of fat mass & ↓ lean mass
12	Ultra-processed food consumption and excess weight among US adults (Steele et al., 2018)	15,977 U.S. adults	Cross-sectional	UPF ≥74 % energy vs ≤37 %: BMI +1.61 units; waist circumference +4.07 cm; Odds of Overweight, Obesity & Abdominal Obesity Increase by 48–62%
13	Ultraprocessed food consumption and increased risk of metabolic syndrome: a systematic review and meta-analysis of observational studies (Shu et al., 2023)	23,500 participants from 9 observational studies	Systematic review & meta-analysis	High consumption of UPF was consistently associated with increased odds of metabolic syndrome (OR ≈ 1.5) and significantly increased individual components of MetS
14	Ultraprocessed food consumption and nonalcoholic fatty liver disease, metabolic syndrome and insulin resistance: A systematic review (Grinshpan et al., 2023)	52,885 participants from 15 studies (1 RCT, 14 observational)	Systematic review	UPF was significantly associated with NAFLD (3/6 studies), MetS (5/8 studies), and insulin resistance (1/3); All large cohorts showed positive relationships
15	Ultra-processed food consumption and human health: an umbrella review of observational evidence (Lane et al., 2024)	Data from 39 meta-analyses covering nearly 9.9 million participants	Umbrella observational review	High consumption of UPF is consistently associated with an increased risk of obesity (OR ≈ 1.55), type 2 diabetes (RR ≈ 1.12), as well as many other outcomes. Evidence of quality between moderate to very suggestive (Class III)
16	Ultra-processed food consumption and human health: an umbrella review of observational evidence	39 meta-analyses, covering up to 9,888,373	Umbrella observational review	High consumption of UPF is consistently associated with an increased risk of obesity (OR ≈ 1.55), diabetes T2D (RR

Yes	Title & Year	Sample	Method	Result
	(Dai et al., 2024	participants		≈ 1.12), cardiometabolic disease, as well as many other adverse health conditions. The quality of the evidence varied from moderate to highly suggestive
17	Impact of ultra-processed foods consumption on the burden of obesity and type 2 diabetes in Belgium: a comparative risk assessment (GutierrezOrtiz et al., 2025)	National population of Belgium (2014/15 food consumption survey data)	Comparative risk assessment based on consumption data & dose–response meta-analysis	Every 10% increase in energy from UPF → risk of obesity increased ~5% (RR = 1.05; 95% CI 0.99–1.13; p≈0.132), type 2 diabetes increased ~13% (RR = 1.13; 95% CI 1.12–1.15; p<0.001); an estimated 21% of obesity cases and 23% of type 2 diabetes cases in Belgium in 2014–15 were related to UPF.
18	Consumption of ultra-processed foods is associated with obesity, diabetes and hypertension in Canadian adults (Nardocci et al., 2021	13,608 Canadian adults (≥19 years old	Cross-sectional	Highest consumption of UPF → OR obesity 1.31 (95% CI 1.06–1.60), diabetes 1.37 (1.01–1.85), hypertension 1.60 (1.26–2.03); UPF's contribution to daily energy is up to 73%.
19	Ultraprocessed food consumption and incident type 2 diabetes: Lifelines prospective cohort study (Duan et al., 2022)	70,421 Dutch adults (aged 35–70 years)	Prospective cohort,	Any 10% increase in energy from UPF was associated with a 25% increase in T2D risk (RR ≈1.25; 95% CI 1.16–1.34); Risk increased by 44% in the highest quartile compared to the lowest (HR ≈1.44; 95% CI 1.04–2.02). Borrow consistent analysis after covariate adjustments.
20	Ultraprocessed food consumption and risk of obesity: a prospective cohort study of UK Biobank (Rauber et al., 2020)	22,659 UK adults aged 40–69	Prospective cohort	The highest participants in UPF consumption had an HR of 1.79 (95% CI 1.06–3.03) for generalized obesity, HR 1.30 (95% CI 1.14–1.48) for abdominal obesity compared to the lowest quartile; the risk of a ≥5% increase in BMI, waist circumference, and higher % body fat.

Discussion

A total of 20 studies were included in this narrative review, comprising observational studies (prospective cohort, cross-sectional, and case-control), intervention trials, as well as systematic reviews and meta-analyses. Overall, the findings consistently indicate that higher consumption of ultra-processed foods (UPFs) is associated with increased risk of obesity and adverse anthropometric outcomes.

Experimental evidence provides strong initial support for this association. A controlled feeding trial (Hall et al., 2019) demonstrated that ad libitum consumption of UPFs led to an additional daily caloric intake of approximately 500 kcal and a weight gain of 0.9 kg within two weeks. Similarly, a community-based randomized controlled trial in Brazil (Lopes et al., 2025) found that very high UPF consumption was associated with nearly half a kilogram of weight gain over the study period. Prospective cohort studies conducted in Europe and Latin America (Konieczna et al., 2021; Sandoval-Insausti et al., 2020; Rauber et al., 2020) further support a dose–response relationship, reporting that each 10% increase in energy intake from UPFs was associated with greater visceral fat deposition, central obesity, and overall obesity risk.

Among children and adolescents, comparable findings were observed. In Iranian adolescents, each 10 g/day increment in UPF consumption increased the risk of metabolically unhealthy obesity by 12–14% (Farzam et al., 2024). Prospective studies in Chilean children and cross-sectional analyses in Korean youth further demonstrated that higher UPF intake was linked to greater adiposity, insulin resistance, and metabolic dysfunction, including metabolic dysfunction-associated steatotic liver disease (MASLD) (Zancheta et al., 2024; Lee et al., 2024). In Portuguese adolescents, a similar trend was reported, although statistical significance was borderline ($p \approx 0.06$) (Machado-Rodrigues et al., 2024).

Large-scale cohort studies reinforce these associations. In U.S. adults, higher UPF intake was linked to significantly higher BMI, waist circumference, and unfavorable body fat distribution (Steele et al., 2018; Liu et al., 2023). Canadian data indicated that individuals in the highest quartile of UPF consumption had 31% higher odds of obesity (Nardocci et al., 2021). A Dutch cohort study reported a 25% increase in type 2 diabetes risk for each 10% increase in UPF-derived energy intake, with risk rising to 44% in the highest quartile (Duan et al., 2022). A comparative risk assessment in Belgium estimated that 21% of national obesity cases and 23% of diabetes cases could be attributed to UPF consumption (Gutierrez-Ortiz et al., 2025).

Systematic reviews and meta-analyses (Shu et al., 2023; Grinshpan et al., 2023; Lane et al., 2024; Dai et al., 2024) consistently report that high UPF consumption increases the risk of obesity (OR ≈ 1.55), metabolic syndrome, non-alcoholic fatty liver disease, insulin resistance, and type 2 diabetes. Evidence quality across umbrella reviews covering up to 10 million participants ranged from moderate to highly suggestive, underscoring the robustness of the association.

Taken together, evidence from these 20 studies demonstrates a consistent pattern: higher UPF consumption is strongly associated with increased adiposity, obesity risk, and related metabolic disorders across diverse populations and age groups. While a minority of studies reported weaker or non-significant associations, the overall direction of findings supports the hypothesis that UPF consumption plays a substantial role in the global obesity epidemic.

Conclusion

The findings of this review clearly demonstrate that ultra-processed food (UPF) consumption is strongly and consistently associated with an increased risk of obesity and related metabolic disorders. Across randomized controlled trials, prospective cohorts, and systematic reviews, higher UPF intake was linked to greater energy consumption, weight gain, adiposity, central obesity, and metabolic dysfunction. The consistency of these findings across age groups, populations, and study designs provides compelling evidence that UPFs are a key dietary driver of the global obesity epidemic. Thus, the objective of this review—to evaluate the strength and consistency of the association between UPF consumption and obesity—has been fully addressed.

Furthermore, the review highlights a plausible causal pathway. UPFs are typically energy-dense, hyper-palatable, and poor in nutrients, leading to overconsumption and impaired satiety regulation. This biological plausibility strengthens the interpretation that the observed associations are not incidental, but rather reflect a significant dietary determinant of excess weight and poor metabolic health. The accumulated evidence therefore underscores the urgent need to address UPF consumption within public health agendas worldwide.

Recommendations

Based on these findings, several recommendations can be proposed. At the **policy level**, governments should consider implementing stronger food regulations, including front-of-pack labeling, taxation of UPFs, and restrictions on marketing to children. At the **public health level**, education campaigns and school-based programs should promote minimally processed, nutrient-rich foods while discouraging reliance on UPFs. In **clinical practice**, dietary guidance to reduce UPF intake should be incorporated into obesity prevention and management strategies. Finally, for **future research**, more long-term interventional studies are needed to establish causality and to evaluate the effectiveness of policy interventions in reducing UPF consumption and improving health outcomes.

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