AJND Reports
African Journal of Nutrition and Dietetics

https://doi.org/10.58460/ajnd.v5i02.202

REVIEW ARTICLE

Ultra Processed Food Consumption and Adolescent Health Outcomes: A Systematic Review

Nourine YEGON[*1], Miriam MUGA[1], and Dominic KIPROTICH[1]

[1] Department of Human Nutrition and Dietetics, School of Medicine and Health Sciences, Kabarak University

*Corresponding Author: chepnoryn@gmail.com

Submitted: 16th January 2026 | Accepted 6th July 2026 | Published Online: 7th August 2026

ABSTRACT

Ultra processed foods (UPFs; NOVA Group 4) are increasingly consumed by adolescents worldwide. This developmental stage is marked by rapid physical growth, hormonal changes, and the establishment of lifelong dietary patterns, making adolescents particularly vulnerable to the nutritional and health consequences of UPFs. There is limited evidence in Sub-Saharan Africa (SSA) in the face of a rapid shift in diet because the region is more exposed to UPFs through urbanization, marketing, and shifting food environments. The study evaluated the relationship between UPF consumption and adolescent health outcomes. The review was done according to PRISMA 2020; five databases (PubMed, Scopus, Web of Science, Embase, AJOL) were searched. Eligible studies included adolescents aged 10-19 years who reported UPF consumption and health outcomes. The reviewers screened and extracted data and determined risk of bias using the Newcastle-Ottawa Scale and Cochrane RoB 2. The GRADE was used to grade certainty of evidence. UPFs contributed 20–60% of total energy intake among adolescents. Higher UPF consumption was consistently associated with poorer diet quality and micronutrient adequacy, and with increased risk of depressive symptoms. Associations with overweight/obesity and metabolic syndrome were mixed in cross sectional studies, but stronger in longitudinal and simulation models (ORs 1.4 -1.8 for overweight/obesity; OR 1.8, 95% CI 1.3–2.5 for metabolic syndrome). Evidence from SSA reflected global patterns but with less pronounced effect sizes, likely due to methodological and contextual differences. The consumption of UPFs is consistently associated with poor health outcomes among adolescents in different regions, including SSA. There is an urgent need to conduct longitudinal studies and intervention programs that are regionally specific.

Keywords: *Ultra processed foods, adolescents, obesity, metabolic syndrome, diet quality, mental health*

How to Cite this Article: YEGON, N., MUGA, M., & KIPROTICH, D. (2026). Ultra Processed Food Consumption and Adolescent Health Outcomes: A Systematic Review. *African Journal of Nutrition and Dietetics*, 5(02). https://doi.org/10.58460/ajnd.v5i02.202

INTRODUCTION

Adolescence is a sensitive period of development that is marked by a high rate of physical development, hormonal effects, and neurocognitive development. This is the time when feeding habits are formed and usually will be carried into adulthood, which determine health outcomes in the long term (Sawyer et al., 2018). Therefore, adolescent nutrition is crucial not only to short-term wellbeing but also to a decrease in lifetime risk of noncommunicable diseases (NCDs) (Patton et al., 2016).

Ultra processed foods (UPFs), which the NOVA classification refers to as industrial combinations of ingredients with minimal or no intact whole food (Monteiro et al., 2019), has been on the rise in the diet of adolescents across the globe. These foods are known to be a significant source of added sugar, sodium, saturated fats, and energy density and low in fiber, quality protein, and essential micronutrients (Moubarac et al., 2017). They are especially attractive to adolescents due to their high exposure, intensive advertising, and low prices, which they are extremely vulnerable to peer pressure and food advertisements (Tsochantaridou et al., 2023).

The health effects of UPF intake during the adolescent stage are devastating. High UPF intake is associated with overweight and obesity (Da Costa Louzada et al., 2015; Enes, Camargo & Justino, 2019), high blood pressure and metabolic syndrome (Ruggiero et al., 2021; Formisano et al., 2025), poor diet quality and micronutrient inadequacy (Wanjohi et al., 2025; Cediel et al., 2021), and risk of mental illnesses (Ren et al., 2025). The specific vulnerability of adolescents is that during the process of growth, their physiological requirements of the nutrients are increased, whereas their diet is becoming more and more dominated by UPFs. Such disparity between nutrition requirements and food consumption predisposes individuals to development of cardiometabolic dysfunction and early onset of NCDs (WHO, 2023).

The nutrition transition is also playing out very fast in Sub Saharan Africa (SSA). Urbanization, globalization of the food systems, and widespread marketing are pushing traditional diets based on minimally processed staples and replacing them with UPFs (Popkin and Ng, 2022). The leading role in this change is played by adolescents in SSA, as an increase in obesity and hypertension cases are recorded and constant deficiencies in micronutrients are observed (Kamanga et al., 2024; Ihensekhien & Oluwagbemileke, 2024). Nevertheless, the evidence that applies to the region is limited compared to Latin America and Europe, which prevents policymakers in developing effective interventions.

Against this background, systematic review was conducted to pool the quantitative results of the health outcomes of UPF consumption among adolescents. The review seeks to expound the level of health risk, identify gaps in methodology, and guide evidence based public health interventions depending on the adolescents in various contexts with the aim of integrating the SSA based findings and other studies around the world.

METHODS

Protocol and Registration

This systematic review was conducted in accordance with the PRISMA 2020 guidelines for transparent reporting of systematic reviews (Page et al., 2021).

Eligibility Criteria

Studies included in the review if they met the following criteria:

Study participants were Adolescents aged 10–19 years.

1. Involved Ultra processed food (UPF) consumption defined using the NOVA classification.
2. Reported quantitative health outcomes including anthropometry (BMI, overweight/obesity, waist circumference), cardiometabolic markers (blood pressure, metabolic syndrome, lipids, glucose), diet quality/micronutrient adequacy, and mental health.
3. Observational (cross sectional, cohort, case control) or intervention studies reporting quantitative associations were included.
4. Peer reviewed articles published after January 2015, in English or with a valid translation.
5. Exclusion criteria: qualitative studies, reviews, editorials, commentaries, and studies not reporting adolescent specific outcomes.

Information Sources

Five electronic databases: PubMed, Scopus, Web of Science, Embase, and AJOL (African Journals Online) were searched for articles that met the set criteria. Grey literature was explored through Google Scholar and institutional repositories. Reference lists of included articles were hand searched to identify additional eligible studies.

Search Strategy

To find the relevant studies, a structured search using both Medical Subject Headings (MeSH) and free text keywords was carried out. These terms were combined with Boolean operators

(AND/OR) to make sure all possible variations were captured. The main search string looked for studies that mentioned:

1. Ultra processed foods (phrases such as "ultraprocessed food", "NOVA group 4", or "processed food")
2. Adolescents (terms like "adolescents", "youth", or "teenagers")
3. Health outcomes (including "BMI", "obesity", "blood pressure", "diet quality", "micronutrient adequacy", or "mental health")

Searches were conducted between September 1 and October 15, 2025, studies from any setting were eligible.

Study Selection

The titles and abstracts that were identified as a result of the search were screened by the reviewers independently. Studies that seemed to be relevant were retrieved in full text. Any ambiguities and differences were resolved through discussion among the reviewers until an agreement was achieved. To keep the results consistent, the inter-rater reliability was measured using Cohen's kappa, which was greater than 0.80, which means a strong agreement. This whole process of selecting the articles was represented in a PRISMA flow diagram, indicating the number of records found, filtered, and finally incorporated in the review.

Data Extraction

A standardized data extraction form was prepared to ensure uniformity in all the studies included. For each article, the following were recorded:

- Characteristics of the study: author, year of publication, country, study design, sample size, and sex distribution.
- Exposure definition: the measurements of UPF consumption were in the form of percentage of energy intake, frequency of intake, or the grouping of intake into quartiles.
- Health outcomes: anthropometric (BMI, overweight/obesity, waist circumference), cardiometabolic (blood pressure, metabolic syndrome, lipids, glucose), diet quality indicators, micronutrient adequacy indicators, and mental health indicators.
- Effect sizes: odds ratios (ORs), hazard ratios (HRs), regression coefficients (β), mean differences, and confidence intervals (CIs) and p-values.
- Risk of bias notes: notes about observations in terms of quality of the study and probable sources of bias.

All the records were handled through EndNote to organize references and Excel spreadsheets handle data. In the case of missing or ambiguous information, the authors of the study were contacted to clarify the information. In case of inability to obtain the data, the study was not excluded from the review, but its result was summarized in a narrative manner to make sure that all the evidence was considered in the synthesis without hiding the limitation of data.

Data Synthesis

Effect sizes (odds ratio, hazard ratio, regression coefficient, mean differences) with confidence interval and p value of all the studies included were extracted. In cases where the studies had similar results, the results were statistically pooled to generate general estimates. Variation of studies was determined by the I_2 statistic and subgroup analysis carried out to investigate study design, geographic region and methods of measuring ultra processed food (UPF) consumption. The stability of the findings was tested by using sensitivity analyses by excluding the studies with high risk of the bias.

Risk of Bias Assessment

To determine the risk of bias for each of the included studies, validated tools were used based on the type of study design. In the case of observational studies (cross-sectional, cohort, case-control), criteria based on the Newcastle-Ottawa Scale (NOS) were applied, which evaluates selection of participants, comparability of groups, and outcome measurement (Wells et al., 2014). In intervention studies, the Cochrane Risk of Bias tool (RoB 2) was used to assess randomization, allocation concealment, blinding, completeness of outcome data, and bias in reporting (Sterne et al., 2019).

The reviewers individually evaluated each study, and the judgment on the domains was recorded as low, moderate, or high risk of bias. Differences were resolved through a discussion until an agreement was reached. Notes of possible sources of bias - e.g., small sample sizes, dependence on self-reported dietary intake, and poor control of confounders were noted when extracting the data.

The general risk of bias profile was described in narrative form, identifying the usual limitations of methodology used in studies. This evaluation was important in the interpretation of results such that conclusions were made based on the quality of the studies.

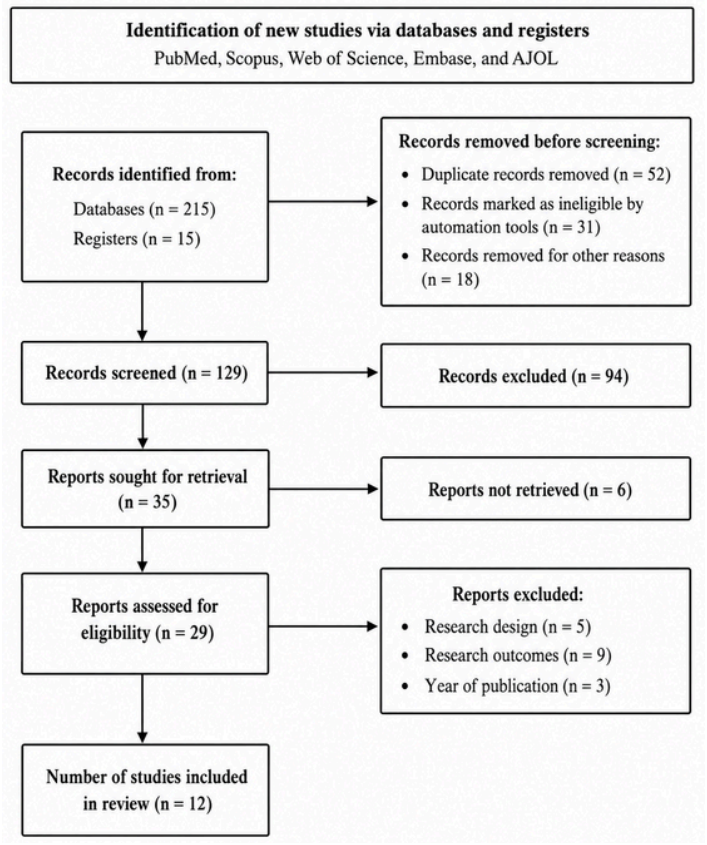

Figure 1: *Study Selection Criteria*

Table 1:

Review Results

No:	Author & Year	Title	Results
1.	Wanjohi et al., K., 2025 (Kenya)	Ultra Processed Food Consumption Is Associated With Poor Diet Quality and Nutrient Intake Among Adolescents in Urban Slums, Kenya	• Cross sectional household survey was used. • 607 adolescents (243 males, 364 females) participated in the study. • Exposure classification: % total energy intake (%TEI) from UPFs, categorized into quartiles (Q1 = lowest intake, Q4 = highest intake). • Mean UPF intake = 25.2% of daily energy (428 kcal/day). • Adolescents with ≥2 h/day screen time had 1.9 times • Higher odds of being in the highest UPF intake quartile compared to those with <2 h/day (OR = 1.9, 95% CI 1.2–3.1, $p < 0.01$). • Diet quality (GDQS) was significantly poorer among adolescents in the highest UPF intake quartile compared to the lowest ($\beta = -2.9$, 95% CI –3.7 to –2.1, $p < 0.001$). • Nutrient profile: higher intake of total fat and saturated fat, but lower intake of protein, fibre, iron, calcium, and zinc. • Bias rating: Moderate (validated dietary assessment, large sample, but cross sectional design limits causal inference).

No:	Author & Year	Title	Results
2.	Yang et al., 2024 (China)	The impact of ultra processed foods and unprocessed or minimally processed foods on the quality of life among adolescents: A longitudinal study from China	• Longitudinal study (baseline 2021, follow up 2022) design was employed. • 3,206 adolescents (1,510 males, 1,696 females) participated in the study. • Weekly frequency of UPF and UMF intake, categorized by NOVA system into specific food groups (instant noodles, sugary beverages, snacks/desserts, fried foods, processed meats, fast food, fruits, vegetables, meats, seafood, soy products, tubers). • Overall UPF intake was associated with lower quality of life scores (All adolescents: β = –2.705, t = –4.52, p < 0.001; Boys: β = –3.480, t = –3.78, p < 0.001; Girls: β = –1.651, t = –2.19, p < 0.05). ◦ Instant noodles: negative impact on QoL (All: β = –2.696, p < 0.001). ◦ Sugary beverages: negative impact on QoL (All: β = –2.838, p < 0.001). ◦ Snacks/desserts: negative impact on QoL for girls only (β = –1.698, p < 0.05). ◦ Fried foods: negative impact on QoL (All: β = –2.796, p < 0.001). o Processed meats: positive impact on QoL (All: β = +1.703, p < 0.001). ◦ Fast food: positive impact on QoL for girls (β = +2.306, p < 0.01). • UMFs (fruits, vegetables, meats, seafood): generally associated with better QoL, while potatoes, tubers, and soy products were linked to lower QoL. • Bias rating: Moderate (large sample, longitudinal design strengthens inference, but self reported diet may introduce
3.	Livingston et al., 2021 (USA)	Effect of reducing ultra processed food consumption on obesity among US adolescents aged 12–18 years: Evidence from a simulation model	• Design: Microsimulation model using NHANES 2011–2016.· Study Participants were 3,176 (Boys: 1,600, Girls: 1,576) • Exposure classification: % daily calories from UPFs (average 66%). Simulation modeled effect of reducing UPF intake to zero. • Mean BMI reduction = –2.15 kg/m² (95% CI –3.31 to –0.82).· Mean weight reduction = –5.90 kg (95% CI –9.08 to –2.26). • Prevalence of overweight reduced from 37.9% to 22.9%. • Prevalence of obesity reduced from 20.8% to 12.1%. • Bias rating: Moderate (robust modeling, but simulation assumptions limit causal inference).

No:	Author & Year	Title	Results
4.	Machado Rodrigues et al., 2024 (Portugal)	UPF Consumption and Its Association with Obesity Risk, Sedentary Behaviors, and Well Being in Adolescents	• Study design used a cross-sectional study. • Study participants were 245 adolescents (131 boys, 114 girls). • Exposure classification: NOVA-UPF screener (previous day and away-from-home intake). • Anthropometric outcomes: Trend toward increased overweight risk with UPF intake, but not statistically significant (OR = 0.91, 95% CI 0.83–1.01, p = 0.06). Girls had higher BMI and body fat % than boys (p < 0.001). • Behavioral outcomes: Boys increased computer use and gaming; girls increased study time. UPF intake correlated with increased TV watching, smartphone use, and gaming. • Psychosocial outcomes: Boys increased well-being scores (p < 0.001). • UPF intake not significantly related to well-being dimensions. • Interpretation: Well being differences were sex linked rather than diet linked in this study
5.	Mesas et al., 2022 (Brazil)	Increased Consumption of UPF and Poor Mental Health in Adolescents	• Cross-sectional study design was used. • Total participants were94, 767 adolescents (45,000 boys, 49,700 girls). • Exposure classification: Number of UPFs consumed in last 24 h (0–13 items, NOVA system; tertiles: 0–3, 4–5, 6–13). • Psychosocial outcomes: Higher UPF intake increased frequency of poor mental health symptoms. ◦ Boys: 3rd tertile increased sadness (β = 0.19, p < 0.001), high “life not worth living” (β = 0.09, p = 0.005), increased sum of all symptoms (β = 0.27, 95% CI 0.03–0.51, p = 0.005). ◦ Girls: 3rd tertile high irritability, feeling uncared for, sadness, “life not worth living” (all p < 0.05); increased sum of all symptoms (β = 0.31, 95% CI 0.13–0.50, p = 0.001). • Sex differences: Girls reported much higher prevalence of poor mental health symptoms (e.g., sadness: 55.3% vs 26.9% in boys). • Bias rating: Moderate (large, nationally representative sample; cross-sectional design limits causal inference).

No:	Author & Year	Title	Results
6.	López Gil et al., 2025 (Spain)	UPF Consumption and Academic Performance in Adolescents: EHDLA Study	• Cross sectional study design was used. • A total of 788 study participants (352 boys, 436 girls). • Exposure classification: Daily servings of UPFs, grouped into tertiles (low, medium, high). • Academic outcomes: Adolescents with higher UPF intake had significantly lower academic performance across all indicators. ◦ Grade Point Average (GPA): Low UPF group mean = 6.6 (95% CI 6.4–6.9); High UPF group mean = 5.6 (95% CI 5.4–5.9). This is a 1.0 point lower GPA in the high UPF group ($p < 0.001$). ◦ Language: Low UPF = 7.0 (95% CI 6.7–7.3); High UPF = 6.0 (95% CI 5.7–6.3). This is a 1.0 point lower score ($p < 0.001$). ◦ Maths: Low UPF = 6.2 (95% CI 5.9–6.5); High UPF = 5.2 (95% CI 4.9–5.6). This is a 1.0 point lower score ($p = 0.011$). ◦ English: Low UPF = 6.6 (95% CI 6.4–6.9); High UPF = 5.7 (95% CI 5.5–6.0). This is a 0.9 point lower score ($p = 0.003$). • Higher UPF consumption was consistently associated with poorer academic performance across GPA and subject grades. • Bias rating: Moderate (validated measures, robust adjustment, but cross sectional design limits causal inference)
7	Xu et al., 2025 (China, Yunnan)	Ultraprocessed foods associated with depressive symptoms among Chinese adolescents	• Cross-sectional study design was employed· • A total of 8,500 study participants (4,184 boys; 4,316 girls. • Exposure: weekly UPF consumption (instant foods, carbonated beverages, energy drinks, other sugary beverages). • Overall prevalence: 28.3% reported depressive symptoms (boys 25.5%, girls 30.9%). • Adolescents consuming more UPFs were significantly more likely to report depressive symptoms. ◦ Instant foods were linked to about 25% higher odds of depressive symptoms (OR ≈ 1.25, $\beta = 0.22$, 95% CI 0.13–0.32, $p < 0.001$). ◦ Carbonated beverages were linked to about 22% higher odds (OR ≈ 1.22, $\beta = 0.20$, 95% CI 0.12–0.29, $p < 0.001$). ◦ Energy drinks were linked to about 23% higher odds (OR ≈ 1.23, $\beta = 0.21$, 95% CI 0.10–0.32, $p < 0.001$). ◦ Other sugary beverages were linked to about 27% higher odds (OR ≈ 1.27, $\beta = 0.24$, 95% CI 0.14–0.34, $p < 0.001$).

No:	Author & Year	Title	Results
			• Girls showed stronger associations — for example, instant foods were linked to about 36% higher odds of depressive symptoms (OR ≈ 1.36, B = 0.29, 95% CI 0.15–0.43, p < 0.001). • Higher UPF intake, especially instant foods and sugary drinks, was consistently associated with a greater likelihood of depressive symptoms, with stronger effects in girls. • Bias rating: Moderate (large sample, validated tools, cross-sectional design).
8	Enes, Camargo & Justino, 2019 (Brazil, Campinas)	Ultra processed food consumption and obesity in adolescents	• Cross sectional study design was used. • A total of 200 adolescents (88 boys; 112 girls) participated. • Exposure: % of total energy intake from UPFs, assessed via a validated food frequency questionnaire. • Average energy intake was 4,176 kcal/day, with UPFs contributing 50.6% of total calories. • Main contributors were industrial breads/cakes (16.2%), sweets/candies (6.2%), pasta (6.0%), and sweetened drinks (5.1%). • Obesity prevalence was 47.0%; 21.5% had increased waist circumference. However, no significant association was found between UPF consumption and BMI, overweight, obesity, or abdominal obesity (ANOVA and linear trend tests, p > 0.05). • Despite high UPF contribution to daily energy intake, this small convenience sample did not show a statistical link between UPF consumption and obesity indicators. • Bias rating: High (limited sample size, non representative, cross sectional design).
9	Crisóstomo et al., 2022 (Brazil, Teresina)	Consumption of ultra processed foods and anthropometric indicators in adolescents	• Cross sectional (population based household survey) study design was used· • Total participants were 120 adolescents (52 boys; 68 girls). • Exposure: % of total energy intake from UPFs, assessed via 24-hour dietary recall. • Participants consumed on average 26.4% of daily calories from UPFs. • Higher UPF intake was paradoxically associated with lower BMI and waist circumference. Each 1% increase in UPF intake was linked to a 0.04 unit lower BMI (β = –0.04, 95% CI –0.06 to –0.01, p = 0.002) and a 0.07 cm lower waist circumference (β = –0.07, 95% CI –0.11 to –0.02, p = 0.008).

No:	Author & Year	Title	Results
			• The inverse association may reflect reverse causality (e.g., overweight adolescents reducing UPF intake, underreporting, or dietary re education). • Bias rating: Moderate (representative sample, validated methods, but cross sectional design and possible reverse causality).
10	Formisano et al., 2025 (Europe, I.Family Study)	Ultra processed foods consumption and metabolic syndrome in European adolescents	• Cross sectional study design was employed. • 645 adolescents (308 boys; 337 girls) participated in the study· • Exposure: % of total energy intake from UPFs, assessed via validated 24-hour dietary recall (SACANA tool), classified with NOVA. • Participants consumed on average 47.5% of daily calories from UPFs. • No statistically significant associations between UPF intake and metabolic syndrome (MetS) z score or its components (BMI, waist circumference, HOMA index, HDL C, triglycerides, blood pressure). Effect sizes were negligible ($\eta^2 = 0.015$). • Participants in the highest UPF quintile tended to have lower BMI and waist circumference z scores compared to those in the lowest quintile. Still, differences were small and not clinically meaningful. • Healthy Diet Adherence Score (HDAS) declined progressively with increasing UPF intake, indicating poorer dietary quality. • High UPF intake (~half of daily calories) was common among European adolescents, but not significantly linked to MetS risk factors in this cross sectional analysis. • Bias rating: Moderate (large multicountry sample, standardized measures, but cross sectional design and possible reverse causality).
11	Reales Moreno et al., 2022 (Spain, Catalonia)	Ultra processed foods and drinks consumption is associated with psychosocial functioning in adolescents	• Cross sectional study was used. • 560 adolescents (217 boys; 327 girls; 16 indeterminate) participated in the study. • Exposure: number of UPF servings consumed in the previous 24 h (screening tool, 24 items). • UPF consumption: Average 7.7 servings/day; boys consumed more (8.7) than girls (7.1). • Fruit and vegetable intake was low (mean 1.9 servings/day), physical activity below recommendations (mean 2.9 days/week). • Adolescents in the highest UPF quartile consumed fewer fruits/vegetables (1.25 vs. 2.24 servings/day, $p = 0.027$).

No:	Author & Year	Title	Results
11	Reales Moreno et al., 2022 (Spain, Catalonia)	Ultra processed foods and drinks consumption is associated with psychosocial functioning in adolescents	• 26.2% had psychosocial impairment (Y-PSC≥30). Subscale prevalence: internalizing problems 33.9%, externalizing problems 3.9%, attention problems 9.5%. ◦ Girls showed higher overall psychosocial impairment and scored higher for depressive, anxiety, and internalizing symptoms ◦ Boys showed stronger associations between UPF intake and psychosocial functioning. ◦ Indeterminate group had more serious behavioral and externalizing problems. • Higher UPF intake was significantly linked to more depressive symptoms ($\beta = 0.11$, $p < 0.001$), internalizing problems ($\beta = 0.10$, $p < 0.001$), and externalizing problems ($\beta = 0.13$, $p < 0.001$). Associations were strongest in boys. • UPF categories consumed: Most common were cold meats (63%), cookies (54%), processed meats (52%), chocolate products (49%), snacks (48%), sauces (42%), flavored yogurts (39%), soft drinks (34%), packaged fruit juices (33%), processed pizza (27%), and energy drinks (14%). • High UPF consumption was linked to poorer psychosocial functioning, particularly depressive and behavioral symptoms, with sex specific differences. Bias rating: Moderate (large sample, validated psychosocial tool, but cross sectional design and self report diet data).
12	Dos Santos et al., 2024 (Brazil, Alagoas)	Association between ultra processed food consumption and cognitive performance among adolescent students from underdeveloped cities in Brazil	• Cross sectional study design was used· • A total of 116 adolescents (56 boys; 60 girls) participated in the study. • Exposure: % of daily energy intake from UPFs, assessed via three 24 hour dietary recalls (two weekdays, one weekend). • UPF contribution: Mean 24.2% of daily calories from UPFs (504 kcal/day). • Cognitive outcomes: Non Verbal General Intelligence Test (NV GIT). • Distribution: 50 adolescents (43.1%) low cognitive performance, 45 (38.8%) medium, 21 (18.1%) high. • Adolescents with low cognitive performance consumed slightly more UPFs (26.5% of energy, 95% CI 22.2–30.7) compared to those with medium high performance (22.5%, 95% CI 18.8–26.2), but differences were not statistically significant ($p = 0.17$). • No differences in energy intake, macronutrients, BMI, waist circumference, physical activity, or socioeconomic status across cognitive groups. • In this low income adolescent sample, UPF intake was similar to national averages (27%), but no significant association was found with cognitive performance. • Bias rating: Moderate (validated cognitive test, multiple dietary recalls, but small convenience sample and cross sectional design).

DISCUSSION

Across all settings, the quality of diet is the most constant casualty of UPF intake. In a study done in Nairobi's slums found that, adolescents in the highest UPF quartile had a poorer Global Diet Quality Scores (GDQS) and lower consumption of protein, fibre, and micronutrients (Wanjohi et al., 2025). This agrees with findings from the European I.Family study, where diet quality deteriorated gradually with increased intake of UPF (Formisano et al., 2025).

Nutritional adequacy of food was lower due to frequent intake of instant noodles and sugary drinks frequently among study participants in a study conducted in China (Yang et al., 2024), highlighting how UPFs replace nutrient-rich foods in teenage diets. This is supported by a project done in Europe that reported that UPFs intake was negatively related to adherence to the Mediterranean diet (Giampieri et al., 2025), additionally a review by United Nations Children's Fund (UNICEF) established that UPF worsen the nutrition of children and lead to the micronutrient deficiencies globally (UNICEF, 2025). On the other hand, Enes, Camargo & Justino (2019) reported no significant association between UPF intake and obesity despite UPFs contributing over 50% of daily energy. This paradox of nutrient displacement may not automatically lead to measurable anthropometric changes in small cross sectional samples. However, the evidence strongly suggests that diet quality is consistently compromised when adolescents rely heavily on UPFs.

Intake of UPF was not directly linked with overweight prevalence (13.3%) according to the study done in kenya (Wanjohi et al., 2025), a pattern also observed among European and brazillian studies (Formisano et al., 2025; Enes, Camargo & Justino, 2019). Such null associations are striking, particularly when contrasted with stronger evidence of positive links reported in other contexts. However, a US microsimulation predicted significant reductions in BMI and obesity prevalence if intake of UPFs were reduced (Livingston et al., 2021). A Brazilian study reported that higher intake of UPF was significantly associated with high prevalence of overweight and obesity (Silva et al., 2023). The discrepancy between cross sectional studies and global reviews possibly mirrors methodological limitations (reverse causality, underreporting) and contextual differences (food environments, socioeconomic status). Generally, evidence suggests that UPFs lead do contribute to obesity risk, even if smaller samples sometimes fail to identify the relationship.

Metabolic syndrome provides a broader understanding of the cardiometabolic consequences of UPFs. Defined by a cluster of risk factors abdominal obesity, hypertension, dyslipidemia, and impaired glucose regulation metabolic syndrome is increasingly observed in adolescents. A study showed that increased intake of UPF was associated with a high prevalence of metabolic syndrome, including central obesity and lipid abnormalities (Formisano et al., 2025). Further, high UPF intake significantly increases risk of metabolic syndrome across age groups (Shu et al., 2023). UPFs are usually energy dense, high in added sugars, sodium, and unhealthy fats, while low in fibre and micronutrients, which promotes insulin resistance, hypertension, and dyslipidemia.

Adolescents who participated in studies in Brazil, Spain, and China consistently reported more sadness, irritability, and depressive symptoms when their diets were high in UPFs (Mesas et al., 2022; Xu et al., 2025; Reales-Moreno et al., 2022). In China, a study found that frequent consumption of instant noodles and sugary drinks was linked to poorer quality of life (Yang et al., 2024), suggesting that the impact of UPFs extends beyond diet quality to psychosocial functioning. According to Bala et al (2025), consumption of UPFs is linked with depression and anxiety across observational studies. Another study further showed that diets high in UPFs are tied to poorer mental health and identified metabolic signatures explaining the link (Sun et al., 2023). However, not all findings align. For example, Portuguese adolescents showed no clear link between UPFs and well being (Machado Rodrigues et al., 2024), this suggests that cultural context or measurement tools shape the associations. While global meta analyses confirm a consistent relationship, local studies remind us that the lived environment family education, peer culture, food marketing may magnify or blunt these effects.

Higher amounts of UPFs intake among Spanish adolescents were associated with worse academic results in both GPA and grades of subjects (López Gil et al., 2025). This is in agreement with a systematic review by Nguyen et al (2025), which found that UPFs damage cognition in children and adolescents. In comparison, a study conducted in Brazil among adolescents from low-income municipalities did not find any significant correlation between UPF intake and non-verbal intelligence scores (Dos Santos et al., 2024). These differences suggest that UPFs have the potential to disrupt academic performance more steadily than general cognitive measures. Diets high in UPFs leads to nutrient dilution, high glycaemic load, and additives impacting neurodevelopment.

Academic performance is a key determinant of future opportunities, and diets characterized by UPFs may silently erode cognitive potential.

Adolescents who spent over two hours daily on screens had a twofold risk of consuming high levels of UPFs (Wanjohi et al., 2025). Such UPF intake in combination with sedentary behaviours is not isolated in Kenya. The same trends were observed among Portuguese adolescents, where TV viewing and gaming were strongly correlated with increased UPF consumption (Machado-Rodrigues et al., 2024). These results indicate that UPFs form part of more general lifestyle habits in which screen time, snacking, and exposure to marketing strengthen each other. The education level of parents and socioeconomic status also affect such behaviours: maternal education played a protective role in preventing overweight and obesity (Rocha et al., 2020), whereas a study reported a higher intake of UPF among adolescents from low socioeconomic backgrounds (Chavez-Ugalde et al., 2024). Screen time exposure, as well as eating with sedentary pursuits, weakens satiety signals, which occurs mechanically by exposing people to persuasive marketing and linking eating behavior with sedentary behaviors. Reduced parental education could diminish food literacy and anti-marketing pressure, and poverty narrows decision-making, making UPFs the lowest priced and most available. These behavioural consequences are not merely risk factors, therefore, but are themselves health consequences, how the adolescents engage with their environments, and how the environments influence their wellbeing.

Limitations

There are a number of limitations associated with this review. To begin with, most of the incorporated studies were cross-sectional, limiting their ability to draw causal conclusions, with potential reverse causality (e.g., the adolescents who became overweight decreased their intake of UPF after the diagnosis, and thus did not correlate with it) being a possibility. Second, there was a great deal of discrepancy in the measure of UPF exposure. Various dietary measurement instruments, including 24-hour recalls, food frequency questionnaires, and the NOVA classification, were employed in some studies, creating heterogeneity and making it difficult to make direct comparisons. Third, the measurement of outcome was usually restricted. It appears that not many studies evaluated metabolic biomarkers in direct proportion, which implies that the effects of UPF consumption on cardiometabolic risks can be underestimated by using BMI and self-reported behaviours. Lastly, it had an evident regional skew in the evidence base, and it is not possible to truly generalize results to the situation of low-income urban areas where UPFs are on the rise.

Conclusion

Across diverse settings, UPF consumption invariably reduces diet quality and is associated with poor psychosocial and academic outcomes. Anthropometric and metabolic associations are less consistent, reflecting methodological limitations of cross sectional designs, though simulation and longitudinal evidence indicate a causal role. Social economic status, cultural background, and screen time have a strong effect on exposure and outcomes.

Inexpensive and accessible UPFs can satisfy short-term hunger, but have unforeseen detriments toF quality of diet, psychological wellbeing, and academic performance. Incorporating the environments that predispose UPFs as a default mode should therefore not be limited to the individual choice in public health strategies. Public health strategies must therefore move beyond education alone, incorporating structural interventions that reshape food environments and reduce reliance on UPFs as the default dietary option for adolescents.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This study did not receive any funding.

REFERENCES

Bala, J., Sukhoi, O., Newson, J. J., Machado, P. P., Lawrence, M., & Thiagarajan, T. C. (2025). Estimation of the nature and magnitude of mental distress in the population associated with ultra-processed food consumption. Frontiers in Nutrition, 12, 1562286. https://doi.org/10.3389/fnut.2025.1562286

Cediel, G., Reyes, M., Corvalán, C., Levy, R. B., Uauy, R., & Monteiro, C. A. (2021). Ultra-processed foods drive to unhealthy diets: evidence from Chile. Public Health Nutrition, 24(7), 1698–1707. https://doi.org/10.1017/S1368980019004737

Chavez-Ugalde, I. Y., de Vocht, F., Jago, R., Adams, J., Ong, K. K., Forouhi, N. G., ... & Toumpakari, Z. (2024). Ultra-processed food consumption in UK adolescents: distribution, trends, and sociodemographic correlates using the National Diet and Nutrition Survey 2008/09 to 2018/19. European journal of nutrition, 63(7), 2709-2723. https://doi.org/10.1007/s00394-024-03458-z

Crisóstomo, J. de M., Rodrigues, L. A. R. L., Nascimento, L. M., Viola, P. C. de A. F., & Frota, K. M. G. (2022). Consumption of ultra-processed foods and anthropometric indicators in adolescents, adults, and the elderly in a capital city in northeastern Brazil. Revista de Nutrição, 35, Article e210052. https://doi.org/10.1590/1678-9865202235e210052

Da Costa Louzada, M. L., Baraldi, L. G., Steele, E. M., Martins, A. P. B., Canella, D. S., Moubarac, J. C., ... & Monteiro, C. A. (2015). Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. Preventive medicine, 81, 9-15. https://doi.org/10.1016/j.ypmed.2015.07.018

Dos Santos, J. V. L., de Melo, I. S. V., Costa, C. A. C. B., de Almeida, L. C., Silva, D. R., Ferro, D. C., ... & Bueno, N. B. (2024). Association Between Ultra-Processed Food Consumption and Cognitive Performance Among Adolescent Students From Underdeveloped Cities in Brazil: A Cross-Sectional Study. International Journal of Public Health, 69, 1607658. https://doi.org/10.3389/ijph.2024.1607658

Enes, C. C., Camargo, C. M. D., & Justino, M. I. C. (2019). Ultra-processed food consumption and obesity in adolescents. Revista de Nutrição, 32, e180170. https://doi.org/10.1590/1678-9865201932e180170

Formisano, A., Dello Russo, M., Lissner, L., Russo, P., Ahrens, W., De Henauw, S., Hebestreit, A., Intemann, T., Hunsberger, M., Molnár, D., Moreno, L. A., Pala, V., Papoutsou, S., Reisch, L., Veidebaum, T., Williams, G., Wolters, M., Siani, A., & Lauria, F. (2025). Ultra-processed foods consumption and metabolic syndrome in European children, adolescents, and adults: Results from the I.Family Study. Nutrients, 17, 2252. https://doi.org/10.3390/nu17132252

Giampieri, F., Rosi, A., Frias-Toral, E., Abdelkarim, O., Aly, M., Ammar, A., ... & Grosso, G. (2025). Unhealthy Ultra-Processed Food, Diet Quality and Adherence to the Mediterranean Diet in Children and Adolescents: The DELICIOUS Project. Foods, 14(15), 2648. https://doi.org/10.3390/foods14152648

Ihensekhien, I., & Oluwagbemileke, F. B. (2024). Assessment of ultra-processed foods consumption dietary pattern of undergraduate students in Ondo City, Ondo State. International Journal of Home Economics, 17(2), 36–47. https://search.informit.org/doi/10.3316/informit.T202504150000309127671650

Kamanga, P., Zhang, B., Kaphera, S., Mwale, S., & Koroma, M. M. (2024). Association between ultra-processed food consumption, sociodemographic characteristics, malnutrition and obesity among urban school-aged children in Lilongwe, Malawi: a cross-sectional study. BMJ open, 14(7), e084120. https://doi.org/10.1136/bmjopen-2024-084120

Livingston, A. S., Cudhea, F., Wang, L., Steele, E. M., Du, M., Wang, Y. C., ... & Zhang, F. F. (2021). Effect of reducing ultraprocessed food consumption on obesity among US children and adolescents aged 7–18 years: evidence from a simulation model. BMJ nutrition, prevention & health, 4(2), 397. https://doi.org/10.1136/bmjnph-2021-000303

López-Gil, J. F., Cisneros-Vásquez, E., Olivares-Arancibia, J., Yañéz-Sepúlveda, R., & Gutiérrez-Espinoza, H. (2025). Investigating the relationship between ultra-processed food consumption and academic performance in the adolescent population: The EHDLA study. Nutrients, 17(3), 524. https://doi.org/10.3390/nu17030524

Machado-Rodrigues, A. M., Padez, C., Rodrigues, D., Dos Santos, E. A., Baptista, L. C., Liz Martins, M., & Fernandes, H. M. (2024). Ultra-processed food consumption and its association with risk of obesity, sedentary behaviors, and well-being in adolescents. Nutrients, 16(22), 3827. https://doi.org/10.3390/nu16223827

Mesas, A. E., González, A. D., de Andrade, S. M., Martínez-Vizcaíno, V., López-Gil, J. F., & Jiménez-López, E. (2022). Increased consumption of ultra-processed food is associated with poor mental health in a nationally representative sample of adolescent students in Brazil. Nutrients, 14(24), 5207. https://doi.org/10.3390/nu14245207

Monteiro, C. A., Cannon, G., Levy, R. B., Moubarac, J.-C., Louzada, M. L., Rauber, F., … Jaime, P. C. (2019). Ultra-processed foods: what they are and how to identify them. Public Health Nutrition, 22(5), 936–941. https://doi:10.1017/S1368980018003762

Moubarac, J. C., Batal, M., Louzada, M. L., Steele, E. M., & Monteiro, C. A. (2017). Consumption of ultra-processed foods predicts diet quality in Canada. Appetite, 108, 512-520. https://doi.org/10.1016/j.appet.2016.11.006

Nguyen, L., Walters, J., Spies, B., Coppus, A., Massie, J., & Bertonha, T. P. (2025). Food for Thought: A Systematic Review and Meta-Analysis on the Effects of Ultra-Processed Foods on Cognition in Children and Adolescents. Food Frontiers, 6(4), 1838-1866. https://doi.org/10.1002/fft2.70064

O. Rocha, S. G., L. Rocha, H. A., M. Leite, Á. J., T. Machado, M. M., Lindsay, A. C., S. Campos, J., ... & L. Correia, L. (2020). Environmental, socioeconomic, maternal, and breastfeeding factors associated with childhood overweight and obesity in Ceara, Brazil: a population-based study. International journal of environmental research and public health, 17(5), 1557. https://doi.org/10.3390/ijerph17051557

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ, 372, n71. https://doi.org/10.1136/bmj.n71

Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., ... & Viner, R. M. (2016). Our future: a Lancet commission on adolescent health and wellbeing. The Lancet, 387(10036), 2423-2478. Retrieved from https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)00579-1/abstract?rss=yes=

Popkin, B. M., & Ng, S. W. (2022). The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. Obesity reviews, 23(1), e13366. https://doi.org/10.1111/obr.13366

Reales-Moreno, M., Tonini, P., Escorihuela, R. M., Solanas, M., Fernández-Barrés, S., Romaguera, D., & Contreras-Rodríguez, O. (2022). Ultra-processed foods and drinks consumption is associated with psychosocial functioning in adolescents. Nutrients, 14(22), 4831. https://doi.org/10.3390/nu14224831

Ren, J., Zhou, L., Li, Y., Zhang, S., Xu, X., Chi, X., & Xie, H. (2025). The independent and combined associations between the intake of ultra-processed foods, sedentary behavior, and depressive symptoms in young adults. Frontiers in Nutrition, 12, 1675892. https://doi.org/10.3389/fnut.2025.1675892

Ruggiero, E., Esposito, S., Costanzo, S., Di Castelnuovo, A., Cerletti, C., Donati, M. B., … Bonaccio, M. (2021). Ultra-processed food consumption and its correlates among Italian children, adolescents and adults from the Italian Nutrition & Health Survey (INHES) cohort study. Public Health Nutrition, 24(18), 6258–6271. https://doi.org/10.1017/S1368980021002767

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. The lancet child & adolescent health, 2(3), 223-228. Retrieved from https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(18)30022-1/abstract

Shu, L., Zhang, X., Zhou, J., Zhu, Q., & Si, C. (2023). Ultra-processed food consumption and increased risk of metabolic syndrome: a systematic review and meta-analysis of observational studies. Frontiers in nutrition, 10, 1211797. https://doi.org/10.3389/fnut.2023.1211797

Silva, L. V., Abdalla, P. P., Bohn, L., de Araújo, R. G., Batalhão, D. D. F., Venturini, A. C. R., ... & Machado, D. R. L. (2023). Association of minimally processed and ultra-processed food daily consumption with obesity in overweight adults: A cross-sectional study. Nutrición Hospitalaria, 40(3), 534-542. http://dx.doi.org/10.20960/nh.04270

Sterne, J. A. C., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., Cates, C. J., Cheng, H.-Y., Corbett, M. S., Eldridge, S. M., Hernán, M. A., Hopewell, S., Hróbjartsson, A., Junqueira, D. R., Jüni, P., Kirkham, J. J., Lasserson, T., Li, T., McAleenan, A., et al. (2019). RoB 2: A revised Cochrane risk-of-bias tool for randomized trials. BMJ, 366, l4898. https://doi.org/10.1136/bmj.l4898

Sun, M., He, Q., Li, G., Zhao, H., Wang, Y., Ma, Z., ... & Shen, Y. (2023). Association of ultra-processed food consumption with incident depression and anxiety: a population-based cohort study. Food & Function, 14(16), 7631-7641. https://doi.org/10.1039/d3fo01120h

Tsochantaridou, A., Sergentanis, T. N., Grammatikopoulou, M. G., Merakou, K., Vassilakou, T., & Kornarou, E. (2023). Food advertisement and dietary choices in adolescents: An overview of recent studies. Children, 10(3), 442. https://doi.org/10.3390/children10030442

United Nations Children's Fund (UNICEF). (2025). Ultra-processed foods and children: A state-of-the-art review. UNICEF. https://www.unicef.org/brazil/media/36621/file/UPF%20and%20Children%20State-of-the-art%20review.pdf.pdf

Wanjohi, M. N., Asiki, G., Wilunda, C., Holdsworth, M., Pradeilles, R., Paulo, L. S., Langat, N., Amugsi, D. A., Kimenju, S., Kimani-Murage, E. W., & Klipstein-Grobusch, K. (2025). Ultra-processed food consumption is associated with poor diet quality and nutrient intake among adolescents in urban slums, Kenya. International Journal of Public Health, 69, 1607891. https://doi.org/10.3389/ijph.2024.1607891

Wells, G. A., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., & Tugwell, P. (2014). The Newcastle–Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. Ottawa Hospital Research Institute. http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp

World Health Organization. (2023). Report of the sixth meeting of the WHO Strategic and Technical Advisory Group of Experts for Maternal, Newborn, Child and Adolescent Health and Nutrition, 15–17 November 2022. World Health Organization. https://www.who.int/publications/i/item/9789240069381

Xu, H., Yang, J., Hu, D., Li, X., & Zhou, F. (2025). Ultraprocessed Foods Associated With Depressive Symptoms Among Chinese Adolescents: Cross-Sectional Study. JMIR Public Health and Surveillance, 11, e75061. https://doi.org/10.2196/75061

Yang, Y., Gao, Y., Yi, X., Hu, Y., Zhao, L., Chen, L., Sui, W., Zhang, S., & Ma, S. (2024). The impact of ultra-processed foods and unprocessed or minimally processed foods on the quality of life among adolescents: a longitudinal study from China. Frontiers in Nutrition, 11, 1489067. https://doi.org/10.3389/fnut.2024.1489067