Education Article

HOSPITAL PHARMACOLOGY
International Multidisciplinary Journal

ISSN 2334-9492 (Online)

Hospital Pharmacology. 2025; 12(2):1664-1673

UDC: 613.2:663/664

doi:10.5937/hpimj2502664T

Health Impacts of Processed And Ultra-Processed Foods

Shariful Islam Tannu[1], Md. Nahid Hasan[2], Majedul M. Hoque[1]

[1] Department of Pharmacy, Jahangirnagar University, Savar, Dhaka, Bangladesh
[2] Department of Pharmacology and Experimental Therapeutics, The University of Toledo, Ohio, USA

SUMMARY

Introduction: Understanding the effects of processed foods on health is becoming increasingly important. Processed foods are products that have undergone changes during preparation to improve their taste, shelf-stability, or convenient qualities. However, the impact of processed food on public health has received little attention of both producers and consumers. Recent studies have demonstrated the connection between eating processed and ultra-processed food and a host of detrimental health outcomes.
Methodology: This review explores recent researches to provide a concise overview of the harmful effects of processed food and ultra-processed food (PF and UPF) on public health in a structured way.
Topic: Consuming large quantities of moderately and highly processed food items has been connected to various health disorder including depression, cancer, high blood pressure, raised cholesterol, inflammation, tooth decay, obesity, CKD and headaches.
Conclusion: Numerous past and recent studies clearly indicate that processed foods have a negative impact on human physiology and overall health. Therefore, the general public should be aware of and understand how processed foods affect public health, and further research on these consequences should be conducted continuously.

Keywords: Public Health, Ultra Processed Foods, Obesity, Cancer

INTRODUCTION

Food systems are complex networks that encompass every task, process, and actor involved in the production, processing, distribution, and consumption of food [1]. They are organized around food value chains—the coordinated set of activities and stakeholders that transform agricultural raw materials into marketable food products [2]. Consumption survey data show that there are vast variations in the proportion of UPFs in diets across the globe. Colombia reports the lowest intake (16%), while the United States has the greatest (58% of daily energy intake). Within Europe, intake likewise varies, with those in Romania consuming 15% of total calories and those in the UK consuming 57% (Figure 1). Food processing negatively impacts its nutritional value, and the additives that are used possess great danger to the general public's health. The amount of nutrients in food is decreased by almost all food processing methods. The largest loss of nutrients occurs, in particular, during processes that expose foods to high temperatures, light, and oxygen. Understanding how

Corresponding author:
Majedul M. Hoque, B. Pharm, MS in Pharmaceutical Science
Department of Pharmacy, Jahangirnagar University, Savar, Dhaka, Bangladesh
E-mail: majed.pharmju44@gmail.com

these processed foods affect our brain, body, and even soul, (Figure 2) it becomes easier to make healthier food choices that will enrich our wellbeing and health.

Originally, food processing was developed to solve the problems of storage and transportation. In recent years, processing has concentrated on making palatable and appetizing food products [4]. Foods and drinks that have been cooked or processed in a way that increases the intake of sodium salt, sugar, preservatives or saturated fat to increase taste and energy intake are considered highly processed. Highly processed foods include frozen spaghetti and pizza, sugary drinks, chocolate, biscuit, cereals, hybrid fruits, candies, ice cream and frozen desserts, fatty foods (burgers), baked goods (cakes, toast, and muffins), and processed meats [4]. The nutritional composition of food has been greatly influenced by food processing. Food processing has concentrated almost exclusively on increasing food palatability and shelf life, but in the modern era, there is a growing need to consider both their potential health impact and environmental impact [3].

One of the primary food sources in contemporary food systems across various nations is now processed food (PF) [5, 6]. Numerous recent studies link high consumption of processed and ultra-processed food (UPF) to a broad spectrum of adverse outcomes—obesity, headaches, hypertension, gastrointestinal disorders, dyslipidaemia, cancer, chronic kidney disease (CKD), and depression [7-10]. The public's health is negatively impacted by PF and UPF, particularly the digestive and cardiovascular systems [11]. This article aims to provide a concise overview of the detrimental effects of PF and UPF on public health analyzing up to date literatures.

METHODOLOGY

A literature search was performed using credible database including SCOPUS, NIH, Google scholar and EBSCO database. The database were searched using the terms UPF, cardiovascular risk from processed foods, food and health, health outcome upon consumption of excessive amount of UPF, facts of food processing, characteristics of UPF to find all papers. The search was limited to English language and in this paper were included the abstract, introduction and discussion are exclusively investigated to find negative impact of processed and ultra-processed foods from the selected literatures.

TOPIC

Common consequences happened during food processing

Using fertilizer: The majority of crops are grown using fertilized soils. The amount of vitamin C in many fruit and vegetable crops tends to decrease with the increased usage of nitrogen fertilizers [12].

Milling for PF and UPF: During the milling process, the husks of cereals such as wheat and rice are removed. Unfortunately, the majority of the plant's nutritional fiber, B-group vitamins, phytochemicals, and certain minerals are found in the husks wasted during milling [12].

Cooking: High-pressure processing (HPP) is used to eliminate microorganisms in foods such as fruit juices, with or without the application of heat. This method has been used in foods such as fruit juices. It has negative impacts on the vitamin content, flavor and color of foods [13].

Preserving PF and UPF: The food's shelf life is increased and many harmful microorganisms are eliminated by heating the food within the can. However, more resistant microbes necessitate intense heat treatment, which could alter the food's flavor and texture and reduce its appeal [12].

Common additives in PF and UPF: Sugar is widely used in food production and available in a variety of forms. However, sweet treats and snacks aren't the only things that contain sugar. A variety of goods, including beverages, breads, salad dressings, and sauces contain added sugar. High intakes of sugar have been connected to weight gain and long-term conditions like type-2 diabetes [14].

Refining PF and UPF: Processed foods often lack essential dietary fiber. Essential fiber and nutrients found in the raw and natural diet are removed during processing. Breads and cereals serve as a perfect example of this. Fiber is typically low in processed foods, which can be harmful to one's health [15].

Extended shelf life of PF and UPF: Salt is frequently added to processed foods to enhance flavor and prolong shelf life. Sodium in salt can be harmful, particularly if someone attempt-

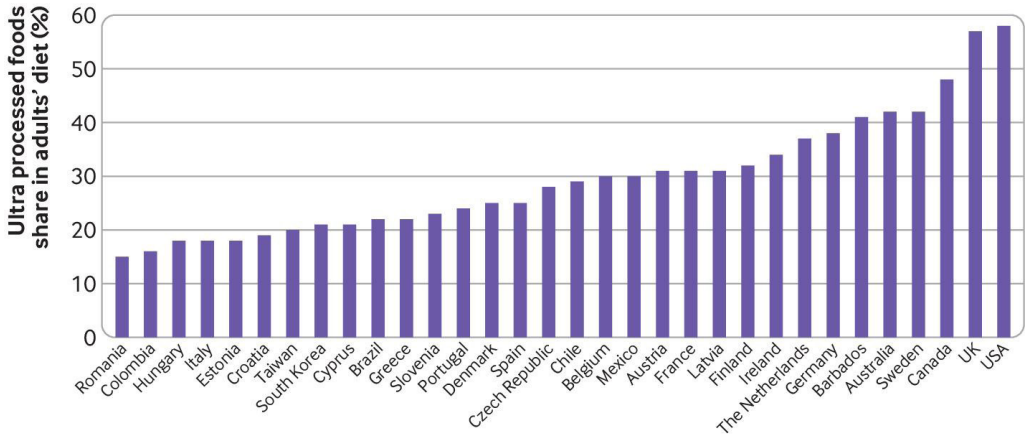

Figure 1. Nationally worldwide representative surveys show the average percentage of ultra-processed foods consumed by adults (as a percentage of calorie consumption). Copyright license CC BY noncommercial from, Srour et al., 2022; Martini et al., 2021 and Touvier et al., 2023 [58-60]

ing to manage hypertension, or elevated blood pressure [16].

Appearance of PF and UPF: In reality, processed foods cannot truly be considered food. Observing how bacteria, fungi, insects, and mammals react to food is one method for determining its dietary worth. For example, whereas processed and synthetic foods mostly maintain their structure and appearance regardless of age, real foods will decay or develop mold [12].

Pesticides in PF and UPF: The production of food is significantly impacted by pesticides. They may extend the total amount of times a crop can be planted on the same piece of land each year, as well as help to raise yields. Pesticides are abundant in processed foods. Depending on the level and type of exposure, pes-

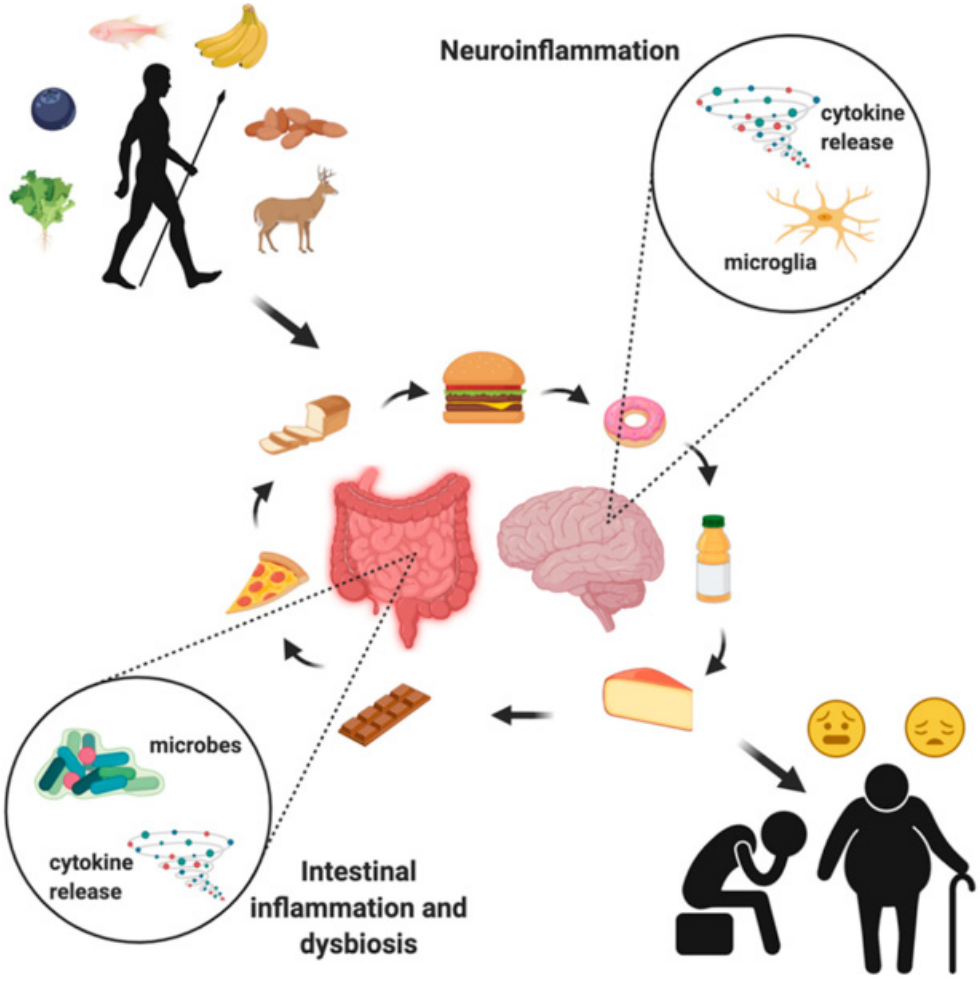

Figure 2. Processed foods evolution from natural foods and ultimate negative consequences on human brain and intestine. Copyright license CC BY from González Olmo et al., 2021 [49]

ticides can be hazardous to humans and have both short-term and long-term health impacts [17].

How food processing reduces the nutritional content of foods, and the use of additives poses a serious risk to the health of the general public discussed below

Obesity: Processed foods lead to obesity due to their high content of additives, sugar, and fat. Eating too many foods high in calories and not exercising enough are the main causes of obesity. Consuming processed and ultra-processed foods is linked to a higher body mass index and obesity, according to a number of studies [18-21]. A high intake of foods and beverages with added sugars has been linked to both type 2 diabetes and obesity. Due to poor nutritional value of processed food and tendency to encourage overeating, people who consume it can gain extra weight [21]. The ability of cells to absorb glucose and eliminate it from the bloodstream is influenced by insulin sensitivity. When this happens, blood sugar levels might remain elevated for extended periods of time, which could result in type 2 diabetes.

Gastrointestinal disorder: The relationship between the consumption of UPFs and the risk of inflammatory bowel disorders has been explained in several cohort studies to date [22-25]. In the food chain, UPFs are consumed in large quantities, and epidemiological research suggests a higher risk of gut disorders such as gastritis, loss of appetite and constipation [26]. Due to the high level of processing involved in their production, these foods are readily absorbed by the body. Many highly processed foods are made from refined grains and lack dietary fiber. The most highly PFs are made from refined grains and lack of healthy fiber. They might also be loaded with additives, sugar, salt, and fat, which can lead to constipation [27]. Effects of UPFs on the composition and metabolism of the gut microbiome are frequently mentioned as a causative mechanism that mediates the elevated risk of gut disease. Despite this presumption, no actual study has been done on specifically examining how UPF affects the human microbiota as a whole [26].

Neoplasm: Higher consumption of UPFs has been linked to an increased risk of cancer and cardiometabolic multimorbidity, according to a groundbreaking multinational study conducted by researchers from the International Agency for Research on Cancer (IARC) in partnership with the University of Vienna (Austria) [28]. Current evidence from multiple studies indicates a persistent and substantial correlation between processed food consumption and the risk of many cancers, including colorectal, breast, and pancreatic cancers [29]. PFs high in dietary phosphorus have also been associated with a greater incidence of breast cancer incidence compared to the standard dietary phosphorus level [30]. Over the past 40 years, processed foods have incorporated more artificial food coloring, such as the popular artificial food dye Allura Red AC (Red 40), which has coincided with an increase in early-onset colorectal cancer [31]. Another study found a favorable correlation between the risk of developing colorectal and breast cancer and consumption of various food coloring chemicals [32].

Vascular diseases: Poor quality processed foods that are low in essential macronutrient and omega-3 fatty acids and rich in salt have been linked to cardiovascular disease [4]. Processed meats and beverages with added sugar or artificial sweeteners were linked to an increased risk of cardiovascular disease (CVD). UPF consumption in the mid-category was linked to a 17%, 23%, and 9% increased risk of CVD, coronary heart disease, and stroke respectively, according to a meta-analyses of prospective studies [33]. The severely degraded physical structure of ultra-processed food can influence glycemic response, satiety, absorption kinetics and the makeup and function of the gut flora, all of which can have an impact on cardiometabolic health [34-36]. Consuming salt or sugar on a daily basis for years increases the risk of stroke. Furthermore, regular drinking of artificially sweetened soda increases the risk of stroke, something that is typically overlooked [50]. High salt not only raise blood pressure but also causes microvascular hemorrhaging, which destroys the inside walls of the blood vessels in the brain that leads permeability and the propensity for hemorrhagic stroke [51]. The prevalence of CVD is rising worldwide, and epidemics of CVD are spreading throughout different parts of the world that are experiencing a rapid change in public health.

Inflammation: Several studies have shown that high consumption of ultra-processed food raises the risk of inflammation, which is a major contributing element to the development

of chronic illnesses including cardiovascular disease [37]. According to a study, people who consumed high amount of UPFs showed higher serum levels of inflammatory markers, which is consistent with the chronic inflammation that contributes to cardiovascular disease [38]. Red meat, fried dishes, and white bread are examples of processed foods high in saturated fats, refined grains, and carbohydrates that can cause inflammation [39]. A study demonstrated a favorable correlation between children's consumption of ultra-processed foods and low-grade inflammation, regardless of obesity [40]. Ongoing research continues to identify processed sugars, refined flours, vegetable oils, and various additives commonly found in processed foods as significant contributors to chronic inflammation.

Mental issue: High consumption of processed „junk" foods has been linked to an increased risk of stress and depression, according to a quantitative synthesis based on cross-sectional studies. Furthermore, combining the findings of cohort studies revealed that eating junk food increases the risk of mental health issues by 16% [41]. A meta-analysis of systematic review showed that eating a lot of processed food was linked to a higher chance of developing depression [42]. According to a comprehensive systematic review and meta-analysis with over 260,000 participants, high UPF consumption was associated with a 28% higher risk of depression, and for every 10% increase in UPFs in total energy intake, there was an 11% higher risk of depression [52]. According to results from the Melbourne Collaborative Cohort Study, individuals who consumed the most UPF were 23% more likely to experience elevated psychological discomfort than those who consumed the least amount [53]. High UPF consumption was linked to increased depressed symptoms, decreased volume in emotional brain regions (such as the amygdala and cingulate cortex), and raised inflammation markers, including white blood cell count, according to a study that included dietary data and brain imaging [54]. High UPF intake (>20% of daily calories) was associated with accelerated cognitive deterioration in persons over 45, according to a study published in Neurology, 2022 [54].

Other health problems: Increased consumption of ultra-processed foods is consistently linked to a higher risk of developing chronic kidney disease (CKD) or a more rapid decline in kidney function (Figure 3), according to recently published observational studies from cohorts in different parts of the world [43-47]. An umbrella study of meta-analyses published in The BMJ found that diets heavy in UPFs are associated with over 30 health problems [48]. Processed food contain emulsifiers, according to in vitro research, carboxymethylcellulose (CMC) can move bacteria throughout the in

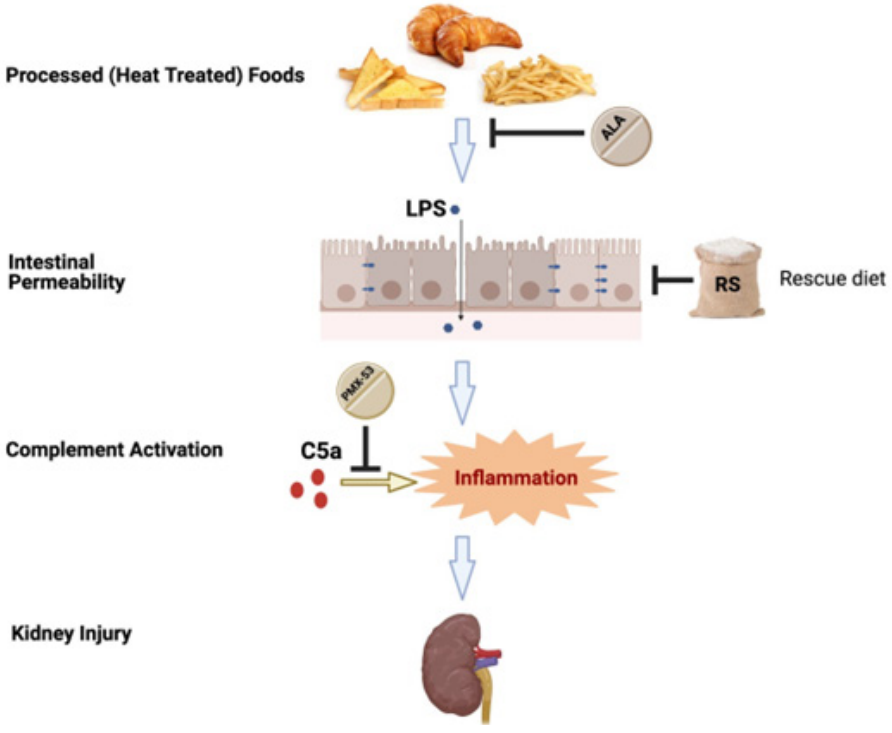

Figure 3. Processed food diets drive intestinal permeability, promote complement C5a activation, inflammation and kidney injury. Source: Medical xpress and Credit: Matthew Snelson and Melinda Coughlan [55]

vitro epithelia, whereas emulsifiers like polysorbate 80 can lead to an overgrowth of bacteria in the small intestine. Studies on mice have shown that this can result in chronic inflammatory illness. Polysorbate 80 and CMC consumption was also linked to the development of tumors and anxiety-like behaviors in mice. Due to high preservative content in processed foods consumers may also experience adverse effects such as headaches or unusual sensation. Consumption of processed foods such as soft drinks, beer, ice-cream and biscuits leads to tooth decay.

Children who consume excessive amounts of ultra-processed foods may develop nutritional imbalance with disorders, disturbances in the way of eating habits and taste preferences development, impairing optimal development of gut microbiota, ingestion of harmful color and chemicals that are not suitable for their growing physiology [56].

Strategies and preventive measures for lowering consumption of PFs and UPFs [57]:

- Aim to incorporate at least one serving of vegetables into home-cooked meals. It might be as easy as adding spinach to scrambled eggs, boiling broccoli as a fast side dish, or adding carrots or cauliflower to casseroles or soups. Vegetables are rich in nutrients and fiber, which help regulate appetite and promote longer-lasting satiety.
- Stocking your kitchen with wholesome snack options can support better dietary choices. Hummus, assorted nuts, fresh fruit, and vegetables are the options might be considered. Overnight oats, homemade kale chips, turkey roll-ups, and hard-boiled eggs all are easy to make and great to have them in hand for later.
- Beverages like fruit juice, soda, sweet tea, and sports drinks are high in sugar and calories, but offer little nutritional value. Replace these beverages with water throughout the day to cut back on processed foods and improve the quality of diet.
- If feasible, try to shop for fresh groceries every few days or every-day. This guarantees that any fresh food you purchase will be consumed promptly and won't have time to be rotten.
- Preparing meals at home gives you greater control over ingredients and reduces reliance on foods with preservatives and additives.
- Creating a weekly meal and snack plan can ensure that wholesome food options are always available.
- In addition to beans and legumes, try to include fiber rich foods like avocados, chia seeds, flaxseeds, and blackberries in diet list. Because it keeps you feeling filled and provides additional nutrients from the fruit or vegetable, moreover consuming fiber through whole meals is preferable than taking supplements.

CONCLUSION

This aim of this article was to discuss various health problems caused by PFs and UPFs. By lowering additives and changing the components in processed foods, food processing technologies and manufacturers can enhance the health and wellbeing of their customers and consumers. By improving food quality, frequency of non-communicable diseases like cancer, GI issues, and cardiovascular disease will decrease. Thus general people should be aware of and comprehend the effects of processed foods on public health, and more advanced research on these effects ought to be performed.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

REFERENCES

1. Von Braun J, Afsana K, Fresco LO, Hassan M, Torero M. Food system concepts and definitions for science and political action. Nat Food. 2021; 2(10):748-750. doi: 10.1038/s43016-021-00361-2. PMID: 37117972.

2. Ambikapathi R, Schneider KR, Davis B, Herrero M, Winters P, Fanzo JC. Global food systems transitions have enabled affordable diets but had less favourable outcomes for nutrition, environmental health, inclusion and equity. Nat Food. 2022; 3(9):764-779. doi: 10.1038/s43016-022-00588-7. PMID: 37118149.

3. Gowlett JA. The discovery of fire by humans: a long and convoluted process. Philos Trans R Soc Lond B Biol Sci. 2016; 371(1696):20150164. doi: 10.1098/rstb.2015.0164. PMID: 27216521.

4.Abdisa T. Review on Public Health Aspects of Processed Foods. J Food Process Technol. 2023; 14:1028.

5. Baker P, Friel S. Food systems transformations, ultra-processed food markets and the nutrition transition in Asia. Global Health. 2016; 12(1):80. doi: 10.1186/s12992-016-0223-3. PMID: 27912772.

6. Silva Meneguelli T, Viana Hinkelmann J, Hermsdorff HHM, Zulet MÁ, Martínez JA, Bres-

san J. Food consumption by degree of processing and cardiometabolic risk: a systematic review. Int J Food Sci Nutr. 2020; 71(6):678-692. doi: 10.1080/09637486.2020.1725961. PMID: 32053758.

7. Rico-Campà A, Martínez-González MA, Alvarez-Alvarez I, Mendonça RD, de la Fuente-Arrillaga C, Gómez-Donoso C, Bes-Rastrollo M. Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study. BMJ. 2019; 365:l1949. doi: 10.1136/bmj.l1949. PMID: 31142450.

8. Trudeau K, Rousseau MC, Parent MÉ. Extent of Food Processing and Risk of Prostate Cancer: The PROtEuS Study in Montreal, Canada. Nutrients. 2020; 12(3):637. doi: 10.3390/nu12030637. PMID: 32121075.

9. Marti A. Ultra-Processed Foods Are Not "Real Food" but Really Affect Your Health. Nutrients. 2019; 11(8):1902. doi: 10.3390/nu11081902. PMID: 31443142.

10. Fiolet T, Srour B, Sellem L, Kesse-Guyot E, Allès B, Méjean C, Deschasaux M, Fassier P, Latino-Martel P, Beslay M, Hercberg S, Lavalette C, Monteiro CA, Julia C, Touvier M. Consumption of ultra-processed foods and cancer risk: results from NutriNet-Santé prospective cohort. BMJ. 2018; 360:k322. doi: 10.1136/bmj.k322.

11. Moubarac JC, Parra DC, Cannon G, Monteiro CA. Food Classification Systems Based on Food Processing: Significance and Implications for Policies and Actions: A Systematic Literature Review and Assessment. Curr Obes Rep. 2014; 3(2):256-72. doi: 10.1007/s13679-014-0092-0. PMID: 26626606.

12. Rameen D. Food Processing and Impact on Nutrition. Sch J Agric Vet Sci 2015; 2(4A):304-311. doi: 10.36347/sjavs.2015.v02i04.007.

13. Balasubramaniam VM, Martínez-Monteagudo SI, Gupta R. Principles and application of high pressure-based technologies in the food industry. Annu Rev Food Sci Technol. 2015; 6:435-62. doi: 10.1146/annurev-food-022814-015539. PMID: 25747234.

14. Weaver CM, Dwyer J, Fulgoni VL 3rd, King JC, Leveille GA, MacDonald RS, Ordovas J, Schnakenberg D. Processed foods: contributions to nutrition. Am J Clin Nutr. 2014; 99(6):1525-42. doi: 10.3945/ajcn.114.089284. PMID: 24760975.

15. Slimani N, Deharveng G, Southgate DA et al., Contribution of highly industrially processed foods to the nutrient intakes and patterns of middle-aged populations in the European Prospective Investigation into Cancer and Nutrition study. Eur J Clin Nutr. 2009; 63 Suppl 4:S206-25. doi: 10.1038/ejcn.2009.82. PMID: 19888275.

16. França EB, Passos VMA, Malta DC, Duncan BB, Ribeiro ALP, Guimarães MDC, Abreu DMX, Vasconcelos AMN, Carneiro M, Teixeira R, Camargos P, Melo APS, Queiroz BL, Schmidt MI, Ishitani L, Ladeira RM, Morais-Neto OL, Bustamante-Teixeira MT, Guerra MR, Bensenor I, Lotufo P, Mooney M, Naghavi M. Cause-specific mortality for 249 causes in Brazil and states during 1990-2015: a systematic analysis for the global burden of disease study 2015. Popul Health Metr. 2017; 15(1):39. doi: 10.1186/s12963-017-0156-y. PMID: 29166948.

17. WHO. Pesticide residues in food (2022). https://www.who.int/news-room/fact-sheets/detail/pesticide-residues-in-food

18. Hall KD, Ayuketah A, Brychta R, Cai H, Cassimatis T, Chen KY, Chung ST, Costa E, Courville A, Darcey V, Fletcher LA, Forde CG, Gharib AM, Guo J, Howard R, Joseph PV, McGehee S, Ouwerkerk R, Raisinger K, Rozga I, Stagliano M, Walter M, Walter PJ, Yang S, Zhou M. Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain: An Inpatient Randomized Controlled Trial of Ad Libitum Food Intake. Cell Metab. 2019; 30(1):67-77.e3. doi: 10.1016/j.cmet.2019.05.008.

19. Ludwig DS, Astrup A, Bazzano LA, Ebbeling CB, Heymsfield SB, King JC, Willett WC. Ultra-Processed Food and Obesity: The Pitfalls of Extrapolation from Short Studies. Cell Metab. 2019; 30(1):3-4. doi: 10.1016/j.cmet.2019.06.004. PMID: 31230987.

20. Zhang Y, Giovannucci EL. Ultra-processed foods and health: a comprehensive review. Crit Rev Food Sci Nutr. 2023; 63(31):10836-10848. doi: 10.1080/10408398.2022.2084359. PMID: 35658669.

21. Poti JM, Braga B, Qin B. Ultra-processed Food Intake and Obesity: What Really Matters for Health-Processing or Nutrient Content? Curr Obes Rep. 2017; 6(4):420-431. doi: 10.1007/s13679-017-0285-4. PMID: 29071481.

22. Narula N, Chang NH, Mohammad D, Wong ECL, Ananthakrishnan AN, Chan SSM, Carbonnel F, Meyer A. Food Processing and Risk of Inflammatory Bowel Disease: A Systematic Review and Meta-Analysis. Clin Gastroenterol Hepatol. 2023; 21(10):2483-2495.e1. doi: 10.1016/j.cgh.2023.01.012. PMID: 36731590.

23. Schnabel L, Buscail C, Sabate JM, Bouchoucha M, Kesse-Guyot E, Allès B, Touvier M, Monteiro CA, Hercberg S, Benamouzig R, Julia C. Association Between Ultra-Processed Food Consumption and Functional Gastrointestinal Disorders: Results From the French NutriNet-Santé Cohort. Am J Gastroenterol. 2018; 113(8):1217-1228. doi: 10.1038/s41395-018-0137-1. PMID: 29904158.

24. Chen J, Wellens J, Kalla R, Fu T, Deng M, Zhang H, Yuan S, Wang X, Theodoratou E, Li X, Satsangi J. Intake of Ultra-processed Foods Is Associated with an Increased Risk of Crohn's Disease: A Cross-sectional and Prospective Analysis of 187 154 Participants in the UK Biobank. J Crohns Colitis. 2023; 17(4):535-552. doi: 10.1093/ecco-jcc/jjac167. PMID: 36305857.

25. Lo CH, Khandpur N, Rossato SL, Lochhead P, Lopes EW, Burke KE, Richter JM, Song M, Ardisson Korat AV, Sun Q, Fung TT, Khalili H, Chan AT, Ananthakrishnan AN. Ultra-processed Foods and Risk of Crohn's Disease and Ulcerative Colitis: A Pro-

spective Cohort Study. Clin Gastroenterol Hepatol. 2022; 20(6):e1323-e1337. doi: 10.1016/j.cgh.2021.08.031. PMID: 34461300.

26. Whelan K, Bancil AS, Lindsay JO, Chassaing B. Ultra-processed foods and food additives in gut health and disease. Nat Rev Gastroenterol Hepatol. 2024; 21(6):406-427. doi: 10.1038/s41575-024-00893-5. PMID: 38388570.

27. How Ultra-Processed Foods Affect Your Gut. (2023) available at: https://www.guthrie.org/blog/how-ultra-processed-foods-affect-your-gut

28. Cordova R, Viallon V, Fontvieille E, Peruchet-Noray L et al., Consumption of ultra-processed foods and risk of multimorbidity of cancer and cardiometabolic diseases: a multinational cohort study. Lancet Reg Health Eur. 2023; 35:100771. doi: 10.1016/j.lanepe.2023.100771. PMID: 38115963.

29. Isaksen IM, Dankel SN. Ultra-processed food consumption and cancer risk: A systematic review and meta-analysis. Clin Nutr. 2023; 42(6):919-928. doi: 10.1016/j.clnu.2023.03.018. PMID: 37087831.

30. Brown RB, Bigelow P, Dubin JA, Mielke JG. High Dietary Phosphorus Is Associated with Increased Breast Cancer Risk in a U.S. Cohort of Middle-Aged Women. Nutrients. 2023; 15(17):3735. doi: 10.3390/nu15173735. PMID: 37686766.

31. Zhang Q, Chumanevich AA, Nguyen I, Chumanevich AA, Sartawi N, Hogan J, Khazan M, Harris Q, Massey B, Chatzistamou I, Buckhaults PJ, Banister CE, Wirth M, Hebert JR, Murphy EA, Hofseth LJ. The synthetic food dye, Red 40, causes DNA damage, causes colonic inflammation, and impacts the microbiome in mice. Toxicol Rep. 2023; 11:221-232. doi: 10.1016/j.toxrep.2023.08.006. PMID: 37719200.

32. Srour B, Javaux G, Coumoul X, Huybrechts I, Hercberg S, Deschasaux-Tanguy M, Touvier M. Fifty shades of food colours – Associations with cancer risk in a French cohort. Eur J Public Health. 2023; 233(Suppl 2):ckad160.890. doi: 10.1093/eurpub/ckad160.890. PMCID: PMC10595581.

33. Mendoza K, Smith-Warner SA, Rossato SL, Khandpur N, Manson JE, Qi L, Rimm EB, Mukamal KJ, Willett WC, Wang M, Hu FB, Mattei J, Sun Q. Ultra-processed foods and cardiovascular disease: analysis of three large US prospective cohorts and a systematic review and meta-analysis of prospective cohort studies. Lancet Reg Health Am. 2024; 37:100859. doi: 10.1016/j.lana.2024.100859. PMID: 39286398.

34. Juul F, Vaidean G, Parekh N. Ultra-processed Foods and Cardiovascular Diseases: Potential Mechanisms of Action. Adv Nutr. 2021; 12(5):1673-1680. doi: 10.1093/advances/nmab049. PMID: 33942057.

35. Rauber F, Levy RB. Ultra-processed foods and cardiovascular disease. Nat Rev Cardiol. 2024; 21(4):213-214. doi: 10.1038/s41569-024-00990-7. PMID: 38291181.

36. Juul F, Deierlein AL, Vaidean G, Quatromoni PA, Parekh N. Ultra-processed Foods and Cardiometabolic Health Outcomes: from Evidence to Practice. Curr Atheroscler Rep. 2022; 24(11):849-860. doi: 10.1007/s11883-022-01061-3. PMID: 36070170.

37. Sawalha K, Tripathi V, Alkhatib D, Alalawi L, Mahmood A, Alexander T. Our Hidden Enemy: Ultra-Processed Foods, Inflammation, and the Battle for Heart Health. Cureus. 2023; 15(10):e47484. doi: 10.7759/cureus.47484. PMID: 38022349.

38. Srour B, Fezeu LK, Kesse-Guyot E, Allès B, Méjean C, Andrianasolo RM, Chazelas E, Deschasaux M, Hercberg S, Galan P, Monteiro CA, Julia C, Touvier M. Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé). BMJ. 2019; 365:l1451. doi: 10.1136/bmj.l1451. PMID: 31142457.

39. Yale New Heaven Health, (2024). available at: https://www.ynhhs.org/articles/what-foods-cause-inflammation

40. Mete B, Sadıkoğlu HM, Demirhindi H, Melekoglu E, Barutcu A, Makca T, Atun Utuk F. The association between ultra-processed food consumption and low-grade inflammation in childhood: A cross-sectional study. Nutr Bull. 2024; 49(4):538-549. doi: 10.1111/nbu.12711. PMID: 39397283.

41. Ejtahed HS, Mardi P, Hejrani B, Mahdavi FS, Ghoreshi B, Gohari K, Heidari-Beni M, Qorbani M. Association between junk food consumption and mental health problems in adults: a systematic review and meta-analysis. BMC Psychiatry. 2024; 24(1):438. doi: 10.1186/s12888-024-05889-8. PMID: 38867156.

42. Lane MM, Gamage E, Travica N, Dissanayaka T, Ashtree DN, Gauci S, Lotfaliany M, O'Neil A, Jacka FN, Marx W. Ultra-Processed Food Consumption and Mental Health: A Systematic Review and Meta-Analysis of Observational Studies. Nutrients. 2022; 14(13):2568. doi: 10.3390/nu14132568. PMID: 35807749.

43. Cai Q, Duan MJ, Dekker LH, Carrero JJ, Avesani CM, Bakker SJL, de Borst MH, Navis GJ. Ultraprocessed food consumption and kidney function decline in a population-based cohort in the Netherlands. Am J Clin Nutr. 2022; 116(1):263-273. doi: 10.1093/ajcn/nqac073. PMID: 35348601.

44. Rey-García J, Donat-Vargas C, Sandoval-Insausti H, Bayan-Bravo A, Moreno-Franco B, Banegas JR, Rodríguez-Artalejo F, Guallar-Castillón P. Ultra-Processed Food Consumption is Associated with Renal Function Decline in Older Adults: A Prospective Cohort Study. Nutrients. 2021; 13(2):428. doi: 10.3390/nu13020428. PMID: 33525613.

45. Osté MCJ, Duan MJ, Gomes-Neto AW, Vinke PC, Carrero JJ, Avesani C, Cai Q, Dekker LH, Navis GJ, Bakker SJL, Corpeleijn E. Ultra-processed foods and risk of all-cause mortality in renal transplant recipients. Am J Clin Nutr. 2022; 115(6):1646-1657. doi: 10.1093/ajcn/nqac053. PMID: 35470855.

46. Gu Y, Li H, Ma H, Zhang S, Meng G et al., Consumption of ultraprocessed food and development of chronic kidney disease: the Tianjin Chronic Low-Grade Systemic Inflammation and Health and UK Biobank Cohort Studies. Am J Clin Nutr. 2023; 117(2):373-382. doi: 10.1016/j.ajcnut.2022.11.005. PMID: 36811571.

47. The Center for Nutritional Psychology. Available at: https://www.nutritional-psychology.org/what-are-ultra-processed-foods-doing-to-your-mental-and-physical-health/ (Accessed, Jan 2025).

48. Lane MM, Gamage E, Du S, Ashtree DN, McGuinness AJ, Gauci S, Baker P, Lawrence M, Rebholz CM, Srour B, Touvier M, Jacka FN, O'Neil A, Segasby T, Marx W. Ultra-processed food exposure and adverse health outcomes: umbrella review of epidemiological meta-analyses. BMJ. 2024; 384:e077310. doi: 10.1136/bmj-2023-077310. PMID: 38418082.

49. González Olmo, B.M.; Butler, M.J.; Barrientos, R.M. Evolution of the Human Diet and Its Impact on Gut Microbiota, Immune Responses, and Brain Health. Nutrients. 2021; 13, 196.

50. Pase MP, Himali JJ, Beiser AS, Aparicio HJ, Satizabal CL, Vasan RS, Seshadri S, Jacques PF. Sugar- and Artificially Sweetened Beverages and the Risks of Incident Stroke and Dementia: A Prospective Cohort Study. Stroke. 2017; 48(5):1139-1146. doi: 10.1161/STROKEAHA.116.016027. PMID: 28428346.

51. Rorije NMG, Olde Engberink RHG, Chahid Y, van Vlies N, van Straalen JP, van den Born BH, Verberne HJ, Vogt L. Microvascular Permeability after an Acute and Chronic Salt Load in Healthy Subjects: A Randomized Open-label Crossover Intervention Study. Anesthesiology. 2018; 128(2):352-360. doi: 10.1097/ALN.0000000000001989. PMID: 29206647.

52. Mazloomi SN, Talebi S, Mehrabani S, Bagheri R, Ghavami A, Zarpoosh M, Mohammadi H, Wong A, Nordvall M, Kermani MAH, Moradi S. The association of ultra-processed food consumption with adult mental health disorders: a systematic review and dose-response meta-analysis of 260,385 participants. Nutr Neurosci. 2023; 26(10):913-931. doi: 10.1080/1028415X.2022.2110188. PMID: 36094005.

53. Lane MM, Lotfaliany M, Hodge AM, O'Neil A, Travica N, Jacka FN, Rocks T, Machado P, Forbes M, Ashtree DN, Marx W. High ultra-processed food consumption is associated with elevated psychological distress as an indicator of depression in adults from the Melbourne Collaborative Cohort Study. J Affect Disord. 2023; 335:57-66. doi: 10.1016/j.jad.2023.04.124. PMID: 37149054.

54. Gómez-Donoso C, Sánchez-Villegas A, Martínez-González MA, Gea A, Mendonça RD, Lahortiga-Ramos F, Bes-Rastrollo M. Ultra-processed food consumption and the incidence of depression in a Mediterranean cohort: the SUN Project. Eur J Nutr. 2020; 59(3):1093-1103. doi: 10.1007/s00394-019-01970-1. PMID: 31055621.

55. Medical xpress. Available at: https://medicalxpress.com/news/2021-04-foods-trigger-chronic-kidney-disease.html (Accessed, March 2025).

56. Mescoloto SB, Pongiluppi G, Domene SMÁ. Ultra-processed food consumption and children and adolescents' health. J Pediatr (Rio J). 2024; 100 Suppl 1(Suppl 1):S18-S30. doi: 10.1016/j.jped.2023.09.006. PMID: 37866398.

57. Angelo anestis aquatic center. Available at: https://www.bexleypools.com.au/7-effective-ways-to-reduce-the-intake-of-processed-food/ (Accessed, March 2025).

58. Srour B, Kordahi MC, Bonazzi E, Deschasaux-Tanguy M, Touvier M, Chassaing B. Ultra-processed foods and human health: from epidemiological evidence to mechanistic insights. Lancet Gastroenterol Hepatol 2022; 7:1128-40. doi: 10.1016/S24681253(22)00169-8.

59. Martini D, Godos J, Bonaccio M, Vitaglione P, Grosso G. Ultra-processed foods and nutritional dietary profile: a meta-analysis of nationally representative samples. Nutrients 2021; 13:3390. doi:10.3390/nu13103390.

60. Touvier M, da Costa Louzada ML, Mozaffarian D, Baker P, Juul F, Srour B. Ultra-processed foods and cardiometabolic health: public health policies to reduce consumption cannot wait. BMJ. 2023; 383:e075294. doi: 10.1136/bmj-2023-075294.

Uticaj prerađene i ultraprerađene hrane na zdravlje

Shariful Islam Tannu[1], Md. Nahid Hasan[2], Majedul M. Hoque[1]

[1] Department of Pharmacy, Jahangirnagar University, Savar, Dhaka, Bangladesh
[2] Department of Pharmacology and Experimental Therapeutics, The University of Toledo, Ohio, USA

KRATAK SADRŽAJ

Uvod: Razumevanje uticaja prerađene hrane na zdravlje postaje sve važnije. Prerađena hrana su proizvodi koji su prošli kroz određene promene tokom pripreme kako bi se poboljšao njihov ukus, trajnost ili praktičnost. Ipak, uticaj prerađene hrane na javno zdravlje dobija malo pažnje i od proizvođača i od potrošača. Najnovija istraživanja su pokazala vezu između konzumacije prerađene i ultra-prerađene hrane i niza štetnih zdravstvenih posledica.
Metodologija: Ovaj pregled analizira najnovija istraživanja kako bi se na sažet i strukturiran način prikazali štetni efekti prerađene i ultra-prerađene hrane (PF i UPF) na javno zdravlje.
Tema: Konzumacija velikih količina umereno i visoko prerađene hrane povezana je sa različitim zdravstvenim poremećajima, uključujući depresiju, rak, visok krvni pritisak, povišen holesterol, upale, kvarenje zuba, gojaznost, hroničnu bolest bubrega (CKD) i glavobolje.
Zaključak: Brojna prethodna i savremena istraživanja jasno pokazuju da prerađena hrana negativno utiče na ljudsku fiziologiju i celokupno zdravlje. Zbog toga je važno da šira javnost bude svesna i razume kako prerađena hrana utiče na javno zdravlje, kao i da se dodatna istraživanja o tim posledicama kontinuirano sprovode.

Ključne reči: Javno zdravlje, Ultra-prerađena hrana, gojaznost, rak

Received: June 19, 2025
Accepted: July 7, 2025