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Artificially sweetened ultraprocessed foods linked to depression in women, study finds

By Sandee LaMotte, CNN

🕒 5 minute read · Published 11:16 AM EDT, Wed September 20, 2023



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(CNN) — Eating greater amounts of ultraprocessed food and drinks, especially if those items are artificially sweetened, may be linked to the development of depression, according to a new study.

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“The study suggests an association between consumption of ultra-processed foods and depression, with an about 50% higher risk for those consuming 9 portions (per day) or more (the top 20%) compared to those consuming 4 portions or less,” Gunter Kuhnle, a professor of food and nutritional science at the University of Reading in the UK, said in a statement. He was not involved in the study.

Ultraprocessed foods include prepackaged soups, sauces, frozen pizza, ready-to-eat meals, and pleasure foods such as hot dogs, sausages, French fries, sodas, store-bought cookies, cakes, candies, doughnuts, ice cream, as well as many more foods and drinks containing artificial sweeteners.

“Our study focused on the link between foods and subsequent risk of developing a new episode of depression,” said study coauthor Dr. Andrew T Chan, a Daniel K. Podolsky professor of medicine at Harvard Medical School and professor of immunology and infectious diseases at Harvard T.H. Chan School of Public Health in Boston.

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[Ultraprocessed foods](#) include hot dogs, sausages, French fries, sodas, store-bought cookies, cakes, candies, ice cream and many foods containing artificial sweeteners.

“However, there is also the possibility that for individuals with chronic depression, ultraprocessed food can worsen their condition,” said Chan, who is also chief of the clinical and translational epidemiology unit at Massachusetts General Hospital in Boston.

When the researchers looked at specific [ultraprocessed foods](#), also known as UPF’s, only foods and drinks made with [artificial sweeteners](#) were associated with an increased risk of depression among the people studied, who were all women, Kuhnle said.

“This is an interesting finding as it suggests the association between UPF intake and depression is driven by a single factor – artificial sweeteners,” he said.

What’s the link?

Why would such foods be associated with the onset of depression? For one, there is a known link between ultraprocessed foods and [chronic inflammation](#), Chan said.



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Inflammation is a root cause of many chronic diseases. For example, studies have linked ultraprocessed foods colorectal cancer in men and heart disease and early death in both men and women.

“Literally hundreds of studies link ultra-processed foods to obesity, cancer, cardiovascular disease, and overall mortality,” Marion Nestle, the Paulette Goddard professor emerita of nutrition, food studies and public health at New York University, told CNN in a 2022 interview.

A 2014 study found a link between diet sodas and diet fruit drinks and depression. People who used artificial sweeteners in their coffee and tea were also more likely to develop depression, according to the study.

There’s a link to dementia as well. If more than 20% of a person’s daily calories come from ultraprocessed foods, the risk of cognitive decline rises about 28%, according to a 2022 study. For a 2,000-calories-a-day diet, that would be 400 calories: In comparison, a small order of fries and regular cheeseburger from McDonald’s together contain a total of 530 calories.

“There is also a link between ultraprocessed food and disruption of the gut microbiome,” Chan said. “This is an important potential mechanism linking ultraprocessed food to depression since there is emerging evidence that microbes in the gut have been linked with mood through their role in metabolizing and producing proteins that have activity in the brain.”

Association, not cause and effect

The study, published Wednesday in the journal JAMA Network Open, examined the diets of nearly 32,000 middle-aged women who are part of the Nurses’ Health Study II, a longitudinal look at women’s health. The study did not include any men so results cannot be generalized.



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In addition, the study is observational, which means that researchers can only find an association between the onset of depression and the intake of ultraprocessed foods. Therefore, the study cannot account for the possibility of a phenomenon known as “reverse causality,” said Dr. David Katz, a specialist in preventive and lifestyle medicine who was not involved in the study.





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“To the extent that sweet beverages and ultraprocessed foods offer an acute, if fleeting, ‘comfort,’ it is also plausible that the early discomforts of burgeoning depression motivate a greater reliance on just such foods,” Katz said. “In this construct, depression causes increased intake of UPFs, rather than the other way around.”

It’s also possible that depression and a higher intake of “junk” and “comfort” foods “feed on each other,” said Katz, who founded the nonprofit [True Health Initiative](#), a global coalition of experts dedicated to evidence-based lifestyle medicine.

“Early depression is likely to compromise dietary restraint and increase intake of ‘comfort’ and ‘junk’ foods. Degrading mood might then further degrade diet, and a degenerating spiral ensues,” he said.

It’s also difficult to separate any impact of diet on depression risk compared with other known risk factors, such as a family history of depression, high stress levels, and the lack of a supportive social network, said Dr. Paul Keedwell, a consultant psychiatrist and fellow of the Royal College of Psychiatrists, in a statement. He was not involved in the study.

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The researchers controlled for a number of other potential causes of depression, such as age, body mass index (BMI), total calories, menopausal hormone therapy, use of alcohol, sleep duration, pain, and other diseases, such as diabetes and hypertension.

“The list of factors associated with UPF consumption, such as greater BMI, more smoking and less exercise, emphasizes just how many confounding factors there may be,” said Keith Frayn, Emeritus Professor of Human Metabolism at the University of Oxford, in a statement. Frayn was not involved in the study.

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“Nevertheless, the authors appear to have adjusted for these as carefully as possible, and the relationship between artificial sweeteners and depression stands out clearly,” Frayn said.

“This adds to growing concerns about artificial sweeteners and cardiometabolic health,” he added. “The link with depression needs confirmation and further research to suggest how it might be brought about.”

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