Ultraprocessed Food and Cardiovascular Risk: Estimating the Number Needed to Harm in an Unfamiliar Situation

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ABSTRACT

The Number Needed to Harm (NNH) statistic is a measure of effect size. It is defined as the number of patients who need to be treated for one additional patient to experience an adverse outcome. The NNH is conventionally calculated in the context of a randomized controlled trial. This article explains how the NNH can be estimated and understood for a lifestyle behavior in the context of an observational study in which the outcome was described using an uncommon unit. The lifestyle behavior, here, was the intake of ultraprocessed food and the outcome was stated as the number of events per 1000 person-years. The NNH can be estimated from the data provided, expressed in different ways, and converted into a form that is relevant to clinical practice.

Key words: *Cardiovascular disease, measures of effect size, number needed to harm, ultraprocessed food*

Many psychiatric disorders are associated with sedentariness, increased appetite and weight, and metabolic dysregulation; these predispose to cardiovascular disease, type 2 diabetes mellitus, metabolic syndrome, and premature mortality. As a part of an approach towards advocating healthy lifestyle behavior in patients, psychiatrists need to know not merely how much patients eat but what they eat. In this context, trans fat, saturated fat, and added sugars are well-known unhealthy components of food. However, for many reasons, including the promotion of public understanding, current dietary guidance emphasizes the nature of food rather than the contents of the food. As examples, foods encouraged for intake include fruit and vegetables and foods discouraged for intake include processed and ultraprocessed foods.

Ultraprocessed foods are foods or beverages that do not exist in the natural state and that have been prepared through industrial processing. Ultraprocessed foods include bakery and other confectioneries, sweet- and savory-packaged

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snacks, hamburgers and pizzas, carbonated beverages and packaged milk shakes, and others. In this context, Srour *et al*.[1] showed that ultraprocessed food intake is associated with an increased risk of cardiovascular disease events.

The data were drawn from the NutriNet-Santi population-based cohort, France, during 2009-2018. The sample comprised 105,159 mostly middle-aged adults for whom 24-hour dietary intake was assessed on a mean of 5.7 occasions across a median follow-up of 5.2 years. Assessment of the degree of food processing was based on the NOVA classification.[2] Analyses compared persons in the highest (31% by weight) versus lowest (8% by weight) quarters of ultraprocessed food intake, based on percentage by weight of total food intake. Analyses were adjusted for important confounds; incidences were adjusted for age and sex.

Across 518,208 person-years of follow-up, the incidence of overall cardiovascular disease events was found to be 277 versus 242 per 100,000 person-years in subjects with high versus low ultraprocessed food intake. For every 10% increase in ultraprocessed food intake, the risk of cardiovascular disease events increased by 12% (Hazard ratio: 1.12; 95% confidence interval: 1.05-1.20). The findings were similar when coronary disease events and cerebrovascular disease events were separately considered. The findings remained statistically significant after adjusting for markers of nutritional quality, such as intake of sodium, sugar, saturated fat, and dietary fiber. The findings remained significant in a wide range of sensitivity analyses.

In summary, the study[1] found that middle-aged adults whose daily diet was high in ultraprocessed food were at an increased risk of experiencing a coronary or cerebrovascular event across about 5 years of follow-up. An obvious take-home message is that, if we want to reduce our risk of cardiovascular events, we must reduce our intake of ultraprocessed food. However, Srour *et al*.[1] did not provide a number needed to harm (NNH) estimate for the risk. So how can the reader estimate the magnitude of risk from the information provided?

The clue lies in the cardiovascular event incidence data for the highest versus lowest quarters of ultraprocessed food intake; this was 277 versus 242 per 100,000 person-years. How does one convert 100,000 person-years into a clinically meaningful NNH value?

From the data, if the incidence was 277 versus 242 per 100,000 person-years for high versus low intake groups, it means that there were 35 extra cardiovascular events per 100,000 person-years in the high intake group. This is arithmetically equivalent to one extra event per 2857 person-years. Thus, the NNH is 2857 person-years.

How does one interpret an NNH expressed in this manner? One possibility is to say that 2857 persons need to fall into the highest quarter of ultraprocessed food intake for one extra person to experience a cardiovascular event during a year of follow-up. Another possibility is to state that one person needs to fall into the highest quarter of ultraprocessed food intake for 2857 years in order to experience a cardiovascular event. Both are fair interpretations of the NNH.

The NNH can be expressed in yet another manner, and one that is more clinically practical. Cardiovascular risks are commonly reckoned across a 5- or 10-year span. Hence, an NNH of 2857 person-years can be restated as follows: if 285.7 persons have a high intake of ultraprocessed food for 10 years, then one extra person will experience a cardiovascular event. Alternately, as Srour *et al*.[1] had a median follow-up of 5.2 years, one might say that the NNH was 571 (i.e., 285.7 × 2) for a 5-year follow-up.

A more detailed discussion on the numbers needed to treat and harm statistics is available elsewhere.[3]

Parting notes

The authors evaluated ultraprocessed food intake in terms of percentage by weight. Thus, persons drinking sugary beverages would have had higher intake using the percentage by weight measure because the water content would contribute to the numerator, but a lower intake using a percentage by calories measure because water is calorie-neutral. Thus, the use of the percentage by weight method could have pushed water ingesting persons into the high intake group. This could explain the small difference in incidences between high and low intake groups, and hence the large NNH.

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Conflicts of interest

There are no conflicts of interest.

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