

Does Olive Oil Reduce the Risk of Cancer

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Does olive oil reduce the risk of cancer? According to a new systematic review and meta-analysis, the answer is yes.¹

The authors conducted a systematic review and meta-analysis of all available epidemiological studies that examined the association between olive oil consumption and cancer risk or prognosis. Forty-five studies were included; 27 case control and 8 cohort studies. The authors conclude that the highest olive oil consumption was associated with a 31% lower risk of cancer as compared to the lowest consumption.

For this review, I'll focus on the limitations of this study, most of which were acknowledged by the researchers in the article reporting their conclusions.

First, the data were self-reported by study subjects, a method known to be highly inaccurate, which the authors acknowledge. People often do not remember what they ate and they tend to under-report consumption of alcohol, second helpings, desserts and other foods and beverages that are unhealthy. They also tend to over-report consumption of "better" foods like fruits and vegetables. Even slight variations can significantly skew research conclusions.²

The National Health and Nutrition Examination Survey (NHANES) is conducted by the Centers For Disease Control. Data is gathered via interviews during which people are asked about their eating habits.³ According to these surveys, most people eat fewer calories than the minimum required to just maintain their weight. According to Edward Archer, Ph.D., during 39 years of gathering NHANES data, calorie intake information for 67.3% of women and 48.7% of men was "not physiologically plausible." Obese women underreported their calorie intake by an average 854 calories per day.⁴

In the case-control studies, food frequency questionnaires were used, and the data were obtained from most subjects via structured interviews. This method is particularly fraught with error. Subjects are asked about their consumption of foods and beverages, sometimes but not always including portion sizes. The usual number of foods included ranges from 80 to 120. Typical questions include "How often do you eat ½ cup of rice? How often do you eat berries?" Responses are dependent on the memory of the subjects, and subjects in intervention groups tend to misreport their diets to a greater extent than do controls.⁵

Significant publication bias was noted by the authors for overall cancer risk, and breast cancer and gastrointestinal cancer risk. Publication bias is defined as the failure to publish results of some studies based on either the direction or strength of the findings. This can result in only studies which have statistically positive results being published,

while those that show statistically insignificant or negative results are not. Many researchers don't publish research with negative results because they consider negative findings to be a failure, which is not true. Negative findings can be important and should be included in reviews like this one. Publication bias tends to particularly impact systematic reviews and meta-analyses, which means that recommendations or guidelines generated by these reviews need to be taken with a grain of salt.⁶

Accounting for confounding factors is another limitation of this study. For example, higher olive oil intake is likely just one factor in a healthier overall dietary pattern. The authors acknowledge that the majority of the studies included in their analysis did not provide details about intake from different food groups or nutrients within those food groups. They also acknowledge that 30 out of 45 studies were limited to Mediterranean populations where olive oil is commonly consumed, while this may not be the case for other populations, including Americans.

There was no information about the type of olive oil consumed by the subjects, and it is well known that the concentration of antioxidants, polyphenols and other constituents is highly variable depending on the quality of the product.

The authors note that both the case-control subjects and hospital-based controls were likely susceptible to both information and selection bias. Information bias is a distortion of the measurement of the association due to lack of accurate measurement of important variables. An example would be not including enough information about overall diet and lifestyle patterns that might be important confounders. Selection bias occurs when the subjects in a study are not representative of the target population about which conclusions are going to be made.⁷

Furthermore, the authors acknowledge that there were concerns about missing information on follow-up with subjects in the included studies. This is a potential source of bias and can compromise a study's validity.

The authors' own admissions make this study somewhat irrelevant. I'll add a few cautions of my own:

- Cancer is a complex disease that is caused by many factors, and diet is an important contributor, but only one of several.
- The likelihood that just the addition of olive oil to daily diet will result in reduced risk of cancer is very low. The stuff does not have magical properties.
- Oil is one of the most calorie-rich foods on the planet – 120 calories and 14 grams of fat per tablespoon. Being overweight is a major risk factor for cancer – and many other diseases. Adding high-calorie, high-fat foods to the diet when two thirds of Americans are overweight or obese is a terrible idea.

¹ Markellos C, Ourailidou ME, Gavriatopoulou M, Halvatsiotis P, Sergentanis TN. "Olive oil intake and cancer risk: A systematic review and meta-analysis." *PLoS One* 2022;17(1):e0261649

² Lee RD, Nieman DC. Nutrition Assessment, 2nd edition. St. Louis, Mo. Mosby 1996

³ https://www.cdc.gov/nchs/nhanes/about_nhanes.htm

⁴ Archer E, Hand G, Blair S. "Validity of U.S. Nutritional Surveillance: National Health and Nutrition Examination Survey Caloric Energy Intake Data, 1971-2010." *PLoS One* October 9, 2013 DOI: 10.1371/journal.pone.0076632

⁵ <https://dietassessmentprimer.cancer.gov/profiles/questionnaire/>

⁶ Nair AS. "Publication bias – Importance of studies with negative results." *Indian J Anaesth* 2019 Jun;63(6):505-507

⁷ Chapter 4. Measurement error and bias

<https://www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated/4-measurement-error-and-bias>