

# The consistency between dietary and serum antioxidant nutrients on cancer risk: a systematic review

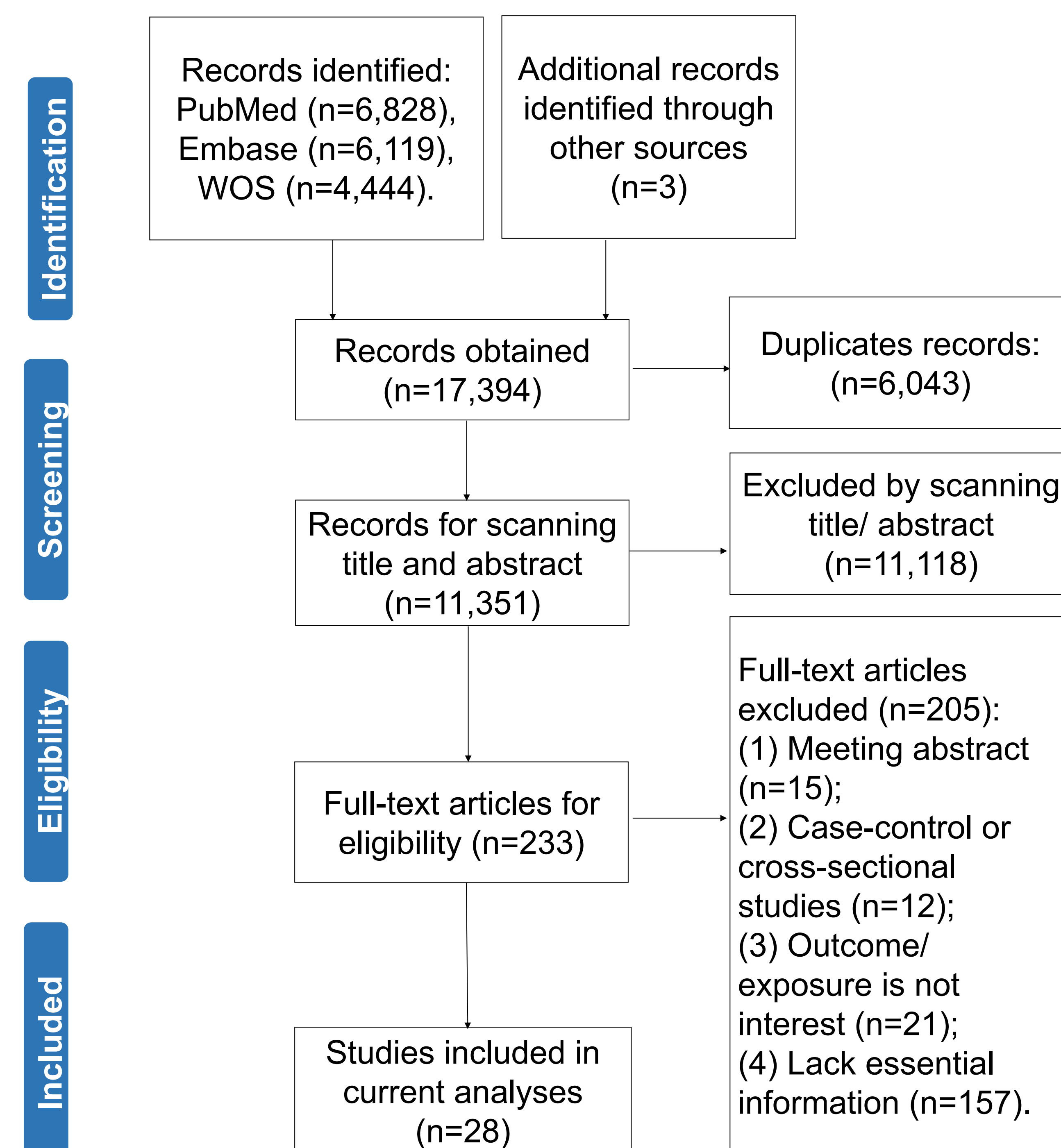
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## Introduction

- Serum biomarkers are a common measurement of exposure to dietary antioxidants and may be considered superior to dietary assessment data given their relative objectivity [1-2].
- Their associations with cancer risk have not been systematically reviewed and compared within the same study population [3-4].
- We aimed to evaluate the consistency of the associations with cancer risk between dietary and serum antioxidant nutrients.

## Methods



Generally, associations between dietary antioxidants intake and cancer risk are consistent with those for serum antioxidants when examined within the same study population.

Table 2 Consistency between the association for dietary intake and serum level results in studies focused on the same population

Group Criteria	Serum level results		Observed agreement
	Null	Yes *	
Based on P value for trend <= 0.05			38/54 = 0.704
Diet intake results	Null	38	10
	Yes *	6	0
Base on 95%CI without null value			41/54 = 0.759
Diet intake results	Null	41	9
	Yes *	4	0

\* Yes means the P value for trend <= 0.05 OR 95%CI excluded the null hypothesis.

## Results

Table 1 Studies included in current systematic review

Cohort Studies included	Outcome	Eating habit duration	Food items	FFQ types	Exposure included
ATBC	Malila, 2002; Nouraie, 2005; Bertoia, 2010; Holick, 2002; Stolzenberg-Solomon, 2009; Weinstein, 2007; Hada, 2019; Michaud, 2002.	12 months	> 200	Quantitative	VA; VC; VE; CR.
EPIC	Leenders, 2014; Jenab, 2006; Jenab, 2006; Bakker, 2016; Nagel, 2010.	Mixed methods	Mixed	Mixed	VA; VC; VE; CR.
WHI	Kabat, 2012; Kabat, 2009; Cui, 2008.	3 months	122	Quantitative	VA; VC; VE; CR.
WHS	Sesso, 2005.	12 months	131	Semiquantitative	LC.
HPFS	Giovannucci, 1995; Graff, 2017.	12 months	131	Semiquantitative	VA; VE; CR.
NHS	Tamimi, 2005; Zhang, 1999.	12 months	131	Semiquantitative	VA; VC; VE; CR.
PCPT	Kristal, 2011; Nash, 2015; Kristal, 2010.	12 months	110	Quantitative	VA; VC; CR.
PLCO	Kirsh, 2006; Peters, 2007; Weinstein, 2012.	12 months	137	Quantitative	VC; VE; CR.

Abbreviations: CRC, Colorectal cancer; GC, Gastric cancer; KC, Kidney cancer; LuC, Lung cancer; PaC, Pancreatic cancer; PrC, Prostate cancer; NHL, Non-Hodgkin lymphoma; BrC, Breast cancer; BIC, Bladder cancer; FFQ, food frequency questionnaire; VA, vitamin A; VC, vitamin C; VE, vitamin E; CR, carotenoids; LC, lycopene.

## Discussion

### ❖ For diet intake:

- Measurement errors in FFQ and food composition tables;
- Dietary resources don't reflect the bioavailability of the nutrients; Potential confounding of other related lifestyle or other nutrients;
- Non-linearity between the diet exposure and cancer risk;
- The digestion and absorption of antioxidants.

### ❖ For serum biomarker:

- Only one-point measurement may not reflect long-term exposure;
- Measurement errors of serum concentration;
- Serum level may be markers of inflammation or other diseases;
- Potential confounding related to the absorption and metabolism;
- Blood is not the main storage organ.

## Reference

1. Aune et. al. Am J Clin Nutr. 2018;108(5):1069-1091.
2. Jayedi et. al. Adv Nutr. 2018;9(6):701-716.
3. Prentice et. al. Am J Clin Nutr 2019;109(4):1189-1196.
4. Mahabir et. al. Cancer Epidemiol Biomarker Prev 2018;27:233-44.