

# Methodological quality of studies published as systematic reviews or metaanalyses on the effects of nutritional/dietary interventions in cancer prevention – a systematic methodological survey

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**Background:** Several dietary/nutritional factors have been identified as associated with increased or decreased risk of cancer, results of many studies were inconsistent. The number of studies published as systematic reviews/metaanalyses (SR/MA) has increased substantially in the recent years. Previous studies on SR/MA in other field concluded that validity of many studies published as SR is questionable. Similar situation may exist in the field of nutrition in cancer prevention, but the evidence in this field is limited.

**Aims:** The main aim of this research is to examine the quality/risk of bias (ROB) and methods of articles published as SR/MA on nutritional/dietary interventions in cancer prevention and examine the associations between characteristics of studies and their quality/ROB. This presentation is related to methodological quality of those studies evaluated with AMSTAR 2 checklist.

Item	Mean	Range
Number of databases searched	2.66	1 to 9
Period between search and publications [months]	10.31	1 to 31
Database searched [%]		
Medline	98.02	
Embase	55.45	
Cochrane	29.70	
Other	11.88	
Type of eligible study design [%]		
RCT	19.80	
CCT	6.93	
Cohort	93.07	
Case- control	78.22	
other	13.86	
Number of included studies in SR/MA	27.76	5 to 572
Number of patients	2,097,180	74 to 99,413,386
Number of people with an outcome for cancer outcomes	22,512	12 to 486,538
Duration of intervention [range]	3 mo to 65 years	
Number of outcomes analysed in SR/MA	2.62	1 to 23

Table Characteristics of included studies

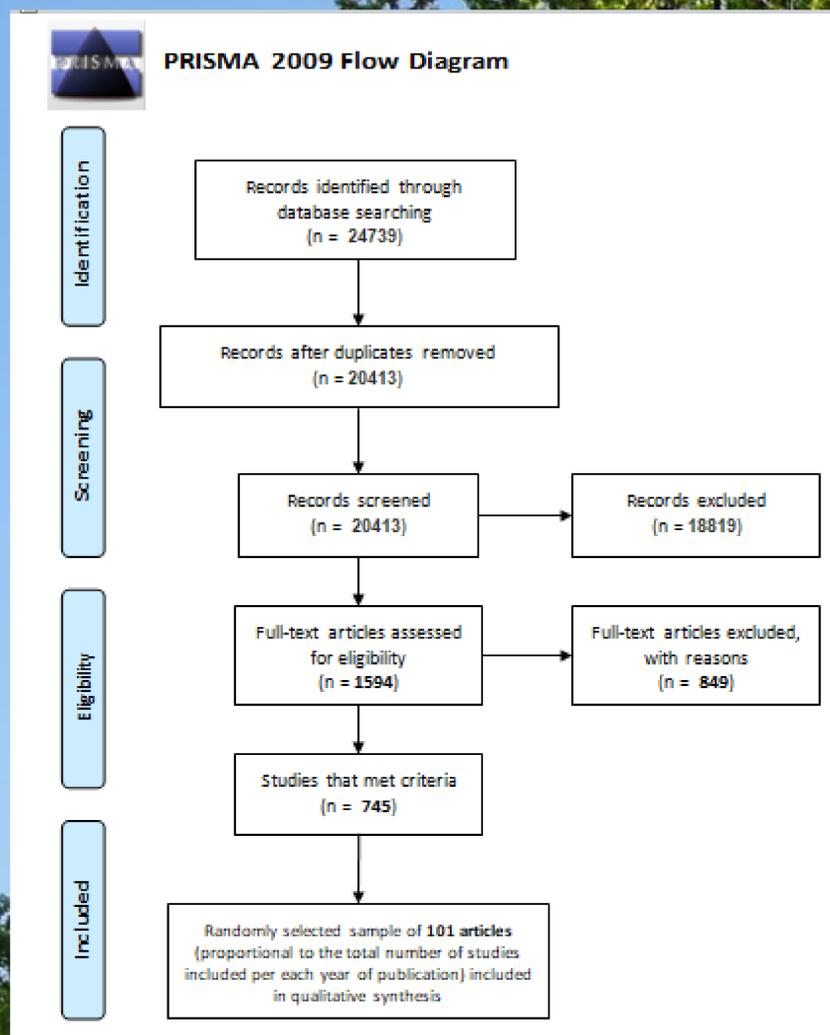


Fig. 1 Prisma flowchart

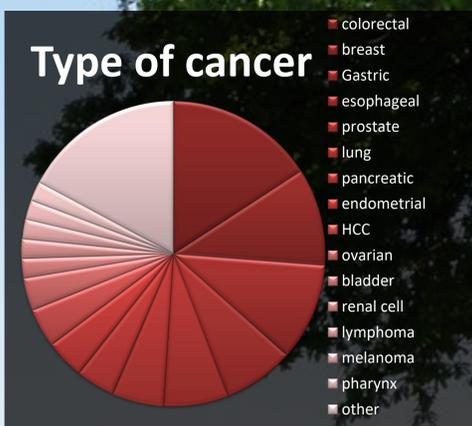


Fig. 2 Type of cancer

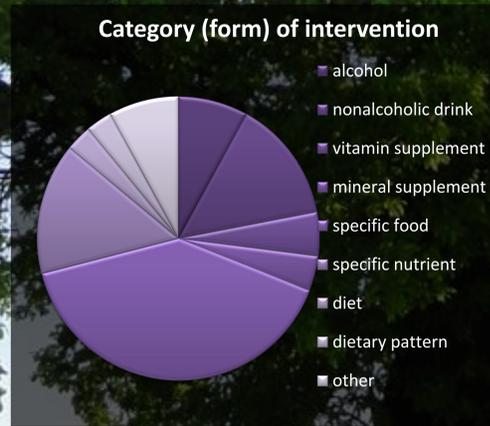


Fig. 3 Category (form) of intervention

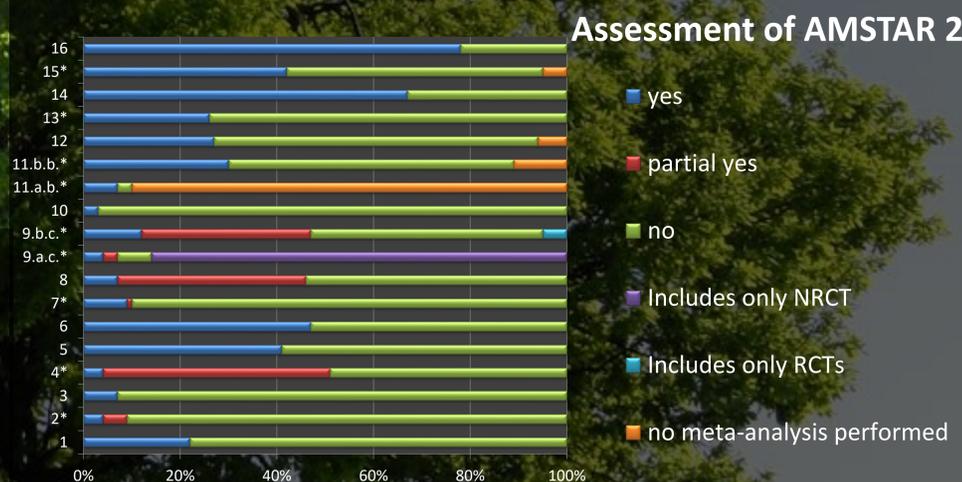


Fig. 4 AMSTAR 2 Assessment

**Results:** Our searches yielded **24,739 references**. After removing duplicates we screened **20,413 references** on the basis of title and abstract and **1594 full texts** of which **745 studies** met inclusion criteria. We randomly selected a sample of **101 articles** (proportional to the total number of studies included per each year of publication) (Fig. 1). The characteristics of included studies is presented in Table and on the Fig. 2 and 3.

Following the guide we calculated the number of 'no' responses in critical and non-critical domains (Figure 4, critical domains are marked with an asterisk).

The methodological quality of 98% included SR and/or MA was classified as 'critically low' (if had more than one major flaw in critical domains), one (1%) SR was classified as 'low' quality (if had one major flaw in critical domain), and one (1%) was assessed as 'moderate', because did not contain any major flaws in critical domains but had more than three flaws identified in non-critical domains. 10% of the published studies had answer 'yes' in 4 or more of the 7 critical domains and just one third of papers had answer 'yes' in 3 of the 7 critical domains.

Common problems identified in those studies were lack of a protocol or explicit statement that the review methods were established in advance (91%), inappropriate use a comprehensive literature search strategy (90%), lack of quality or risk of bias assessment of primary studies included in SR/MA (74%). Heterogeneity was commonly examined using Q test or I2 or both (76%), but it was common to pool different study designs in one metaanalysis. The most common type of metaanalysis used was highest vs lowest consumption alone (50%) or together with dose response (36%)

**Conclusions:** We believe that the results of our study highlight a significant problem concerning the lack of appropriate quality of SR/MA published in the field of nutrition in cancer prevention. We think Journals should insist to evaluate the quality of submitted SR/MA. Our study highlights potential areas for improvement in the quality of future SR and/or MA by encouraging the authors to follow the existing guidelines such as the Cochrane Handbook and to prospectively register their systematic review protocol with PROSPERO database.

**Methods:** We searched MEDLINE, EMBASE and Cochrane Library from 2010 using specially designed search strategies. We included articles identified as SR/MA in the title and/or abstract or full text which included **primary studies with control group** (such as RCT, CCT, other study with control group) carried out in general population or people at risk for cancer, which evaluated the effects of any **nutritional/dietary intervention** (such as changes in the intake of any type of foods or supplements or changing dietary constituents) in cancer prevention (i.e. with the aim to decrease **risk of cancer**). Outcomes required to be reported in the SR/MA to be included in the survey included any **cancer incidence/mortality** according to the definitions and times of measurement defined by the authors of the SR/MA.

Following calibration exercises title and abstract screening and full text screening was performed by two reviewers independently. Conflicts were resolved by discussion and if necessary third reviewer was involved.

Following piloting of the extraction forms, extraction was carried out by two reviewers independently. Conflicts were resolved by discussions, if necessary third reviewer was involved. The assessment of methodological quality using AMSTAR 2 tool (and risk of bias - not presented here) was carried out along with the extraction process by two reviewers independently. Conflicts were resolved by discussions, if necessary third reviewer was involved. The protocol was registered in PROSPERO (CRD42019121116)