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Association between Diet and Cancer risk: a review

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Abstract

Background: The link between cancer and diet is just as mysterious as the disease itself. Much research has pointed toward certain foods and nutrients that may help prevent or conversely, contribute to certain types of cancer.This study focused about aspects of diet that are linked to cancer by the current scientific evidence. Only good-quality evidence is included here.
Objectives: The objectives of this study were to present an updated review on the association between diet and cancer risk.
Methods: Relevant studies were identified by searching PubMed, Scopus, SpringerLink, ArticleFirst, Wiley Online, and Science-Direct electronic databases using these search terms and key words: cancer; prevention; diet; risk; nutrition. Furthermore, references from retrieved articles were also reviewed. Evidence from prospective studies confirmed significant inverse associations between diet and cancer risk.
Results: High fibre foods like wholegrains, pulses, fruit and vegetables that help keep a healthy weight and reduce the risk of some cancers. Processed and red meats, that increase the risk of weight gain, also increase the risk of bowel cancer.
Conclusion: Reviews of all studies has shown eating more of fibre per day can reduce the risk of bowel cancer. Red and processed meat could increase the risk of cancer.

Keywords:

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1. Introduction

India is likely to have over 17.3 lakh new cases of cancer and over 8.8 lakh deaths due to the disease by 2020 with cancers of breast, lung and cervix topping the list [1]. There are several environmental factors that influence cancer development. Studies demonstrate an independent effect of dietary patterns on cancer risk which is modifiable by diet [2]. Evidence suggests that diet represents 30-35% of all risk factors contributing to the onset of cancer. Positive health effects have been reported for vegetables, fruits, and whole grains [3]. Whole grain foods, rich in dietary fiber, minerals, vitamins, and phytochemicals, are recognized as agents exerting health protective effects [4] . Much of the research on relationships between diet and cancer risk is based on the hypothesis that high intake of these nutrients rich in antioxidants (e.g., polyphenolic compounds, lignans, vitamins) may affect a number of physiological and pathological processes. People with less healthy diets are more likely to develop cancer. Many studies have been conducted looking at the association between diet and cancer, and experts agree that the food eat can affect risk of cancer [4].While

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diet and weight loss are central for cancer prevention, combining a good diet with other healthy habits can further lower risk [1] [4].
The objective of this study was to present an updated review on the association between Diet and cancer risk.

2. Research Method

An integrative review of the literature was carried out prior to July 2017. Relevant articles were identified by applying search strategies to six academic electronic databases: PubMed, Scopus, SpringerLink, ArticleFirst, Wiley Online, and Science-Direct. Search terms and key words included: cancer; prevention; diet; risk; nutrition. All retrieved titles, abstracts, and full-text publications were reviewed and screened for relevance to the topic. Furthermore, references from retrieved articles were reviewed to identify additional applicable publications.
Inclusion/exclusion criteria: Inclusion criteria for refereed study samples includedobservational studies. Other article typessuch as conference abstracts, communications, commentaries,editorials, brief reports, position, and hypothesis generatingstatements were excluded. Non-refereed publications were also excluded. A flowchart of the studyscreening and selection is presented in Fig. 1.

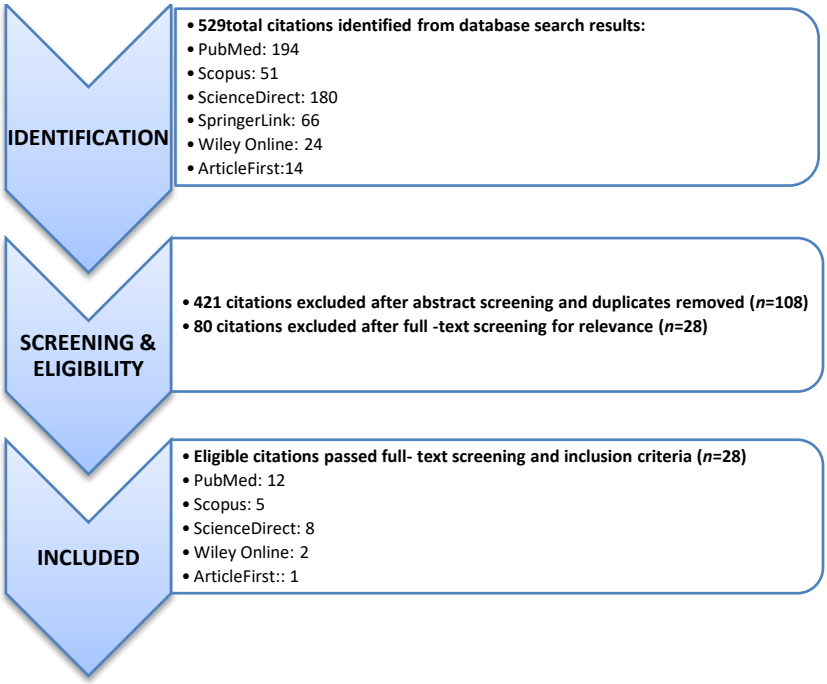

Fig. 1 Flow diagram of literature search process

3. Results and Analysis

The key facts about diet and cancer risk, and supporting evidence have find from academic research and scientific studies.
***Fruit and vegetable may reduce the risk of some cancers*:** Research has suggested that eating fruit and vegetables could reduce the risk of mouth, upper throat, larynx and lung cancers [5] [6]. Fruit and vegetables contain a wide variety of different nutrients with properties that could make it more difficult for cancer to develop [7]. These nutrients include carotenoids, folate, vitamin C, vitamin E, selenium, flavonoids and various other phytochemicals [8]. Fruit and vegetables are also a very good source of natural fibre [9], and there is strong evidence that eating foods high in fibre reduces the risk of bowel cancer [10].Eating plenty of fruit and vegetables can also help keep a healthy body weight [11]. There is strong evidence that obesity increases the risk of 13 types of cancer, including bowel and breast (post-menopausal). Eating plenty of fruit and vegetables can also reduce the risk of other diseases including heart disease [12].

***Eating foods high in fibre can reduce the risk of bowel cancer*:** Foods high in fibre include wholegrain foods (e.g. brown bread, brown rice, rolled oats), fruit and vegetables, and pulses (e.g. beans and lentils). Scientists estimate that more than one in ten (12%) bowel cancers are linked to a low fibre diet [14]. A review of all studies on the topic has shown eating 10g of fibre per day can reduce the risk of bowel cancer

by around 10% [13]. Cereal fibre seems to have the most effect on reducing bowel cancer risk [15]. While the reasons for this aren't fully understood, dietary fibre could help protect against bowel cancer in a number of ways [16]Fibre dilutes the contents of poo, and increases their bulk and the frequency of bowel movements. All of this reduces the contact time between the bowel and harmful chemicals in poo [17]. Bacteria in the bowel interact with fibre to produce several chemicals including butyrate. Butyrate changes the conditions in the bowel, so that tumours are less likely to develop [18].In the India, average fibre intake is below the recommended level (Recommended Dietary Allowances, 2010).

Eating a diet high in processed and red meat can increase the risk of bowel cancer: Red meat includes all fresh, minced and frozen beef, pork and lamb. Processed meat includes ham, bacon, salami and sausages [19].The International Agency for Research on Cancer classifies processed meat as a cause of cancer, and red meat as a probable cause of cancer [20]. Scientists estimate around a quarter of bowel cancer cases in men, and around a sixth in women, are linked to eating red or processed meat [14]. Bowel cancer risk increases by nearly a fifth (17%) for every 100g of red meat eaten per day, and by a similar amount (18%) for every 50g of processed meat eaten per day [21]. There is also some evidence linking red meat to pancreatic cancer and prostate cancer, and processed meat to stomach cancer, however this is still uncertain [22] [23].
There is no strong evidence that eating fresh white meat, such as chicken, or fish increases the risk of cancer [24].

Processed and red meat contains chemicals that could cause cancer:There are a few different ways red and processed meat could increase the risk of cancer. The biological reasons for the link between red and processed meat and cancer are still unclear, but it is likely that chemicals found in red and processed meat play a part [20].Nitrites and nitrates are used to preserve processed meat and may explain why studies find that processed meat increases the risk of cancer to a greater extent than red meat [20]. Nitrite and nitrates can be converted into N-nitroso compounds during the curing process and in the body. Several N-nitroso compounds can cause cancer [25]. In the UK, the addition of nitrates to food is tightly regulated by the Food Standards Agency. Cooking meat at high temperatures can produce chemicals which may cause cancer [25] [28]. Heterocyclic aromatic amines (HAAs) are formed in larger amounts when meats are cooked at very high temperatures, such as by frying and grilling. Polycyclic aromatic hydrocarbons (PAHs) are formed when the meat is smoked or cooked over direct heat, such as barbecuing [30][26].

Eating salt- preseserved food could increase the risk of atomach cancer:There is some evidence that eating foods that have been preserved with salt could increase the risk of stomach cancer. Most evidence comes from foods eaten in countries like India [1]. Salt could affect the risk of stomach cancer by damaging the lining of the stomach and causing inflammation, or by making the stomach lining more sensitive to carcinogens such as nitrates. Salt could also interact with a stomach bug called Helicobacter pylori that cause both stomach ulcers and stomach cancer [27]. The link between total salt and cancer is less clear, however cannot rule out a link. And too much salt can increase blood pressure [28], which increases the risk of heart disease and stroke In the India, typically eat much more than the recommended less than 6g of salt per day [29].

4. Conclusion

Most research only points to associations between diet and cancer, and not necessarily a cause-and-effect relationship. "It not 100% certain that consuming more or less of certain foods or nutrients will guarantee cancer protection," but evidence has found that certain dietary habits tend to have a greater influence. Evidence indicates that eat more fruit and vegetables for reducing the risk of mouth, upper throat, and larynx cancers. Eat at least five portions of fruit and vegetables a day for reducing the risk of cancer. Reviews of all studies have shown eating more of fibre per day can reduce the risk of bowel cancer. Red and processed meat could increase the risk of cancer.Antioxidants are important for cancer prevention, as they help neutralize free radicals that can damage cells.

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