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Nutrition and Cancer: A Review of the Evidence of Nutritional Influences and Related Mechanisms

Mohammadreza Vafa

Abstract:

Cancer is the leading cause of death worldwide and constitutes a great burden on society in both more and less economically developed countries alike. The World Health Organization (WHO) anticipates worldwide cancer rates to continue elevating because of lifestyle choices, such as poor dietary intake and the elevating incidence of overweight, obesity and physical inactivity. Improving lifestyle such as diet and nutrition status, and physical activity may be an important strategy for reducing cancer risk. This review tries to consolidate present knowledge of nutritional factors, diet and cancer and points out areas requiring further research and investigation.

Keywords: Nutrition; Diet; Nutrition component; Cancer mechanisms

Introduction:

In today's world, people are living longer and the average life expectancy has increased worldwide. However, poor eating habits and metabolic factors contrast with this development and are among the main risk factors for mortality worldwide [1]. In general, the most common cause of morbidity and premature death are noncommunicable diseases, including cancer [2]. Cancer accounts for around 13% of deaths worldwide [3].

It is becoming increasingly evident as research continues that nutrition plays an important role in cancer. It has been estimated by the American Institute for Cancer Research and the World Cancer Research Fund that 30 to 40 percent of all cancers can be hindered by proper diet, physical activity, maintaining proper body weight [4]. It is probably higher than that for certain types of cancer.

This review will examine protective dietary factors that have been shown to help reduce the risk of cancer and dietary factors that increase the risk of cancer. Finally, some studies on the complete diet will be noted, which gives a more complete picture of how these individual elements work together to reduce the risk of cancer.

Method:

The data was obtained according to the result of original and review articles associating with the nutrition intake, diet, nutrition component and cancer, and related mechanisms. For this purpose, we mostly used the online database PubMed and google scholar search engines, with the use of following keywords: “nutrition intake”, “diet”,development [5,6]. An expert panel convoked by the International Agency for Research on Cancer (IARC) has reported 16 types of cancer are now probably or convincingly related to excessive body weight, making obesity the second major cause of cancer after smoking [7]. In addition, physical activity decreases the risk of colon cancer by an estimated 30% [8]. While elevated physical activity alone is not sufficient to achieve considerable weight loss, it is a main factor in weight maintenance and an essential component of energy balance [9].

This impact of dietary intervention on cancer risk were investigated in the Women’s Health Initiative (WHI) Dietary Modification (WHI- DM) trial, a randomized controlled trial of 48835 postmenopausal women aged 50-79 years in the USA, a dietary intervention in which decreased total fat intake and increased intake of grains, vegetables and fruits [10]. Women in the intervention group lost a mean of 2.2 kg of body weight in the first year and maintained lower weight during 7.5 years of follow-up than participants in the control group [11]. While, low fat diet did not decrease long-term colorectal cancer risk among women in the intervention group (HR

1.08, 95% CI 0.90-1.29) [10], recent findings published in 2018, demonstrate that low fat dietary intake led to decrease incidence of pancreatic cancer among women who were overweight or obese (HR 0.71, 95% CI 0.53-0.96) [12]. The observed discrepancies between cancer types might be attributed to the limited achieved weight loss among participants of the study population over a long study duration. Moreover, members of the study were postmenopausal women (50-79 years), a population with changed hormonal status and older age. Colorectal cancer develops during multiple decades, and so, an intervention after menopause will probably have limited impacts.

How the biological mechanisms of interventional approaches such as intentional weight loss, exercise, and diet affect tumorigenesis is not fully understood. However, during the past decades a considerable body of research has explained components that are evident mediators of energy balance-cancer link, and many of these mediators connect with one or more of the cancer biomarkers [21].

Conclusion:

This review tries to strengthen present knowledge of nutritional factors, diet, and cancer and points out areas requiring further research and investigation. It describes the modifying role of energy balance and individual dietary components in neoplasia and summarized its related mechanisms put forward to explain the dietary impacts.

Protective components in prevention and treatment of cancer include omega-3 fatty acids, vitamin D, vitamin K, Vitamin B12, folic acid, selenium, and antioxidants such as carotenoids. Ascorbic acid has limited advantages orally, but could be useful intravenously. Probiotics also has benefits as anticancer dietary factor. Cancer risk can be decreased through getting to and staying at a healthy weight, adopting an overall dietary pattern that emphasizes a variety of fruits and vegetables, whole grains, fewer red and processed meats, and being physically active.

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