Dietary patterns and the risk of esophageal squamous cell carcinoma: A population-based case–control study in a rural population

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Original article

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1. Introduction

Esophageal cancer (EC) is one of the most common cancers and the most common causes of cancer death worldwide [1]. The overwhelming majority of EC cases and deaths occurred in the developing countries, including China [1]. There were 288,000 cases diagnosed annually in China [2], contributing to about 50% of the world’s total EC cases [1]. In China, EC was the third most common cancer in rural areas and the sixth in urban areas [3]. It was estimated that more than 90% of diagnosed EC cases in the country were esophageal squamous cell carcinoma (ESCC) [3].

Existing evidence has suggested some dietary components have pivotal roles in carcinogenic process of EC [4,5]. In practice, different foods and nutrients are often mixed together and consumed foods contain literally thousands of nutrients and chemicals. These foods and nutrients likely have interactive effects. Studies on individual nutrients or foods hardly assess synergistic or inhibitory effects. Therefore, observed associations between individual nutrient/food and health outcomes may be attenuated [6]. Dietary pattern, as a holistic and comprehensive approach, may better capture the effects of diets. Dietary patterns can more accurately assess actual dietary exposure, better control dietary...
confounders, deal with problems of conflicting results, and identify nutrients or foods that may have a relatively small effect. A recent literature review provided some suggestive evidence on the association between dietary patterns and ESCC risk [7]. Furthermore, dietary pattern might be a better method for appropriate intervention [8].

However, no study was available on the association between dietary pattern and ESCC risk in China, where there were high incidence and mortality rates of ESCC. Therefore, we designed and conducted the current study in Yanting County located in Sichuan Province, which is one of the areas with the highest incidence and mortality of ESCC in China [2]. The incidence of ESCC in Yanting was 100.11/100,000 for males and 57.10/100,000 for females according to 2009 data [3], much higher than the rates of Sichuan Province (10.38/100,000 for combined genders) [9], and rates of the country (24.42/100,000 for males, 9.60/100,000 for females) [2], and rural area as a whole (32.96/100,000 for males, 14.21/100,000 for females) [2]. Most of people in Yanting were farmers with low socio-economic status. The people had a special preference for cereals and tuber-crops, pickled and preserved vegetables, and salted meat [10–15]. Although there have been a great change in eating habits and lifestyle in Chinese population in recent decades, such changes have been relatively small and slow in Yanting area because of historically low economic status and geographically remote [16]. Some lab studies indicated that that Yanting diets could induce esophageal cancer in human cell lines [17,18]. Epidemiological studies conducted in Yanting also suggested possible roles of several individual foods or dietary habits in the development of ESCC [11–15]. The objective of the current study was to explore the associations of dietary patterns with the risk of ESCC.

2. Subjects and methods

The case–control study was carried out during two years, from June 2011 to May 2013. A detailed recruitment of cases and controls was described elsewhere [13]. Briefly, ESCC cases were selected from Yanting Tumor Hospital, a main institution to diagnose and treat ESCC in the area [14]. Inclusion criteria for cases were: 1) men or women who were aged 40–70 years, 2) newly diagnosed primary incident ESCC confirmed pathologically (ICD-10, code-C15), and 3) having lived in the Yanting area for at least 15 years. Those who had lived outside of Yanting area for six months or longer in the last 15 years were excluded. Among eligible ESCC cases, there were 942 (96%) cases who accepted an interview, accounting for more than 70% of incident cases during the period of the study. By comparing the recruited cases with non-recruited eligible cases, we did not find significant differences in age and gender.

The controls were selected by using a multi-stage sampling method from local residents. Inclusion criteria were: 1) no history of neoplasm at any site; 2) no digestive tract disease; and 3) having lived in the Yanting area for at least 15 years. Although there have been a great change in eating habits and lifestyle in Chinese population in recent decades, such changes have been relatively small and slow in Yanting area because of historically low economic status and geographically remote [16]. Some lab studies indicated that that Yanting diets could induce esophageal cancer in human cell lines [17,18]. Epidemiological studies conducted in Yanting also suggested possible roles of several individual foods or dietary habits in the development of ESCC [11–15]. The objective of the current study was to explore the associations of dietary patterns with the risk of ESCC.
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