Journal of Traditional Chinese Medical Sciences (2015) 2, 105–110

HOSTED BY

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/jtcms

Association between dietary habits and recurrent respiratory infection in children: A case–control study

Wang Zhang [a,b,1], He Yu [a,1], Jinbang Shang [a,c], Tiegang Liu [a], Jiaju Ma [a,d], Xiaohong Gu [a,*]

[a] School of Basic Medical Science, Beijing University of Chinese Medicine, Beijing 100029, China
[b] Beijing Drum Tower Hospital of Traditional Chinese Medicine, Beijing 100009, China
[c] Dongzhimen Hospital, Beijing University of Chinese Medicine, Beijing 101121, China
[d] Beijing Hospital of Chinese Medicine, Beijing 100010, China

Received 15 December 2014; accepted 16 February 2015
Available online 15 March 2016

KEYWORDS
Case–control study;
Recurrent respiratory infection;
Dietary habits

Abstract *Objective:* To explore the association between dietary habits and recurrent respiratory infection (RRI) in children aged 0–14 years.
Methods: This case–control study compared dietary data of children with (cases) and without RRI (controls) collected via structured questionnaire. Participants were recruited from Chinese medicine clinics, hospitals, and children's learning institutions in Beijing. A logistic regression analysis and odds ratio (OR) calculations were conducted using SPSS 17.0 software.
Results: A total of 241 questionnaires were collected (case:control ratio: approximately 2:1). Frequent consumption of processed foods (OR = 2.988, 95% confidence intervals 1.375–6.491) and high-sugar foods (OR = 2.268, 95% confidence intervals 1.163–4.424), frequent picky eating (OR = 2.614, 95% confidence intervals 1.363–5.014), and a meat-heavy diet with fewer vegetables (OR = 1.830, 95% confidence intervals 1.358–2.467) correlated positively correlated with RRI. Additionally, 57.80% of the children with RRI were addicted to high-sugar foods, compared with 41.57% of the children without RRI ($P = .015$). Furthermore, 63.16% of the children with RRI were picky eaters, compared with 48.31% of the children without RRI ($P = .024$). Finally, 30.92% of the children with RRI frequently consumed processed foods, compared with only 17.98% of the children without RRI ($P = .027$).

* Corresponding author.
E-mail address: Guxh1003@126.com (X. Gu).
Peer review under responsibility of Beijing University of Chinese Medicine.
[1] These authors contributed equally to this work.

http://dx.doi.org/10.1016/j.jtcms.2016.01.003

Conclusion: Although RRI correlates positively with several dietary habits, in the future, prospective cohort studies with larger samples are needed to generalize these findings.

Introduction

Influenza commonly occurs in children and it is often associated with a high incidence of complications.[1] For example, the morbidity of recurrent respiratory infection (RRI), which is characterized by reoccurrence of infection within a relative period of normalcy, is increasing in pediatric cases. The prevalence of acute upper respiratory tract infection is highest among children, with annual diagnosis rates of one in every two children aged 0—4 years and one in every 10 of those aged 5—9 years.[2] However, the true incidence of RRI is much higher, as parents normally do not consult doctors when their children develop an upper respiratory tract infection.[2]

A number of studies have explored the cause of RRI in children. Recurrent or persistent respiratory infection is suggestive of a deficiency in local or systemic host defense or an underlying pulmonary disorder that might have resulted from structural, functional, or environmental causes.[3] The reported causes of RRI vary and include a lack of nutrients or vitamins such as Vitamin A,[4] low serum levels of iron and zinc, an excess of heavy metal elements such as lead, and changes that weaken or dysregulate the immune system, such as a low or high serum level of immunoglobulin (Ig) or complement, a history of allergy, and the possibility of inherited allergies.[5,6] Additionally, the mother's dietary habits and health condition during pregnancy have been suggested as causes.[7] Furthermore, viruses, bacteria, and other pathogenic microorganisms have also blamed for pediatric cases of RRI. Chen[8] found that the frequencies of the promoter LXP haplotype and B allele were significantly higher in patients with RRI than in the controls, and noted that LXP and the B allele were the risk factors for this condition.

Through our work, we have observed that children with RRI often suffer from gastrointestinal disorders that might be attributable to an unhealthy diet, even before the occurrence of RRI, thus suggesting a potential causal role of dietary habits in the incidence of RRI.[9—11] Genetics, the mode of birth, infant feeding patterns, antibiotic usage, sanitary living conditions, and long-term dietary habits are all known to influence the composition of the gut microbiome.[12] However, few studies have examined the potential association between dietary habits and RRI in children. We therefore have hypothesized a potential association between dietary habits and pediatric RRI. To test this hypothesis, we have conducted a case—control study in which children (age 0—14 years) with RRI were compared to those without RRI, using data from the structured questionnaires.

Methods

Settings

This study was conducted at several locations in Beijing, China. The participants were recruited from the Guoyitang TCM Clinic Department of the Beijing University of Chinese Medicine, the Pediatric Clinic Department of Beijing Dongzhimen Hospital, the Respiratory Clinic Department of Xiyuan Hospital, and a children's learning institution in Beijing.

RRI diagnostic criteria

According to the diagnostic criteria[13] (Table 1), RRI cases were defined according to the participants' reports.

Statistical methods

Data were collected using the structured questionnaires that asked about dietary structure, dietary and related behaviors, and RRI in the previous year. Questions were submitted to children (>6 years old) and their (≤6 years old) parents and the questionnaires were filled by face to face interview.

Raw data were entered in the data extraction table using Epidata 3.10 database software (available at http://www.epidata.dk/index.htm). Using SPSS 17.0 software (SPSS, Inc. Chicago, IL, USA) the baseline data, sex, and age were compared between the case and control groups via a

Table 1 Recurrent respiratory infection diagnostic items.

Age (years)	Recurrent respiratory infections (times/year)	Repeated bronchitis (times/year)	Recurrent pneumonia (times/year)
0—2	7	3	2
3—5	6	2	2
6—14	5	2	2

Notes: (1) The interval time between two infections should be no less than 7 days. (2) Upper and lower respiratory infection frequencies should be pooled if the former fails to achieve the required standard. A diagnosis of repeated lower respiratory infections should be made if infections occurred repeatedly in the lower respiratory tract. (3) One year of follow-up is needed to determine the respiratory infection frequency. (4) Recurrent pneumonia refers to the development of pneumonia two or more times within one year; pneumonia must be diagnosed according to physical respiratory symptoms and medical imaging findings, and pathologic changes should disappear completely between the two infections.