

Correlation Analysis of Traditional Chinese Medicine Syndrome Types and Influencing Factors of Asthmatic Bronchitis in Children

Miao Ren, Shijie Luo*

Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi Province, China

*Corresponding author: Shijie Luo, 2213341822@qq.com

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Abstract: *Objective:* To explore the correlation between traditional Chinese medicine (TCM) syndrome types and the influencing factors of asthmatic bronchitis in children, as well as to provide clinical syndrome differentiation basis and reference for the treatment of children with asthmatic bronchitis. *Methods:* The clinical data of 197 inpatients with asthmatic bronchitis in our hospital from March 2021 to March 2022 were collected, referring to “Zhu Futang Practical Pediatrics” (7th Edition, 2002) and “Chinese Medicine Industry Standards – Standards for Diagnosis and Efficacy of Pediatric Diseases and Syndromes of Traditional Chinese Medicine” (1994, State Administration of Traditional Chinese Medicine) for diagnosis, classification, and analysis of TCM syndrome types and the influencing factors of asthmatic bronchitis in children. *Results:* (i) cold asthma syndrome contributed to the majority of TCM syndrome types of pediatric asthmatic bronchitis; (ii) gender had a great influence on TCM syndromes types in children with asthmatic bronchitis, and the differences among the TCM syndrome types were statistically significant ($P < 0.05$); (iii) there was no significant difference in the distribution of TCM syndrome types of pediatric asthmatic bronchitis among different age groups ($P > 0.05$); (iv) birth status had no effect on the distribution of TCM syndrome types of pediatric asthmatic bronchitis ($P > 0.05$); (v) no significant correlation was observed between the mode of delivery and the distribution of TCM syndrome types in children with asthmatic bronchitis ($P > 0.05$); (vi) children with cold asthma syndrome, heat asthma syndrome, and mixed cold and heat syndrome were not breastfed, and there was no significant difference in the feeding methods of children with mixed deficiency and excess syndrome ($P > 0.05$); (vii) no significant correlation was observed between the TCM syndrome types of pediatric asthmatic bronchitis and family history of asthma/allergy ($P > 0.05$); (viii) a significant correlation was observed between different TCM syndrome types and history of drug and food allergy ($P < 0.05$); (ix) normal or high eosinophil percentage was commonly observed in children with asthmatic bronchitis, and there was no significant difference among the different TCM syndrome types ($P > 0.05$). *Conclusion:* The TCM syndrome types of pediatric asthmatic bronchitis are related to gender, feeding history, allergy history, and other factors, which may be influencing factors of the TCM syndrome types of pediatric asthmatic bronchitis.

Keywords: Asthmatic bronchitis; Children; TCM syndrome types; Influencing factors

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1. Introduction

Pediatric asthmatic bronchitis, also known as asthmatic bronchitis, refers to a common bronchial-pulmonary disease in infants and young children. Its clinical manifestations include wheezing, coughing, shortness of breath, and difficulty in breathing.

Chinese medicine classifies pediatric asthmatic bronchitis into categories such as “wheeze” and “lung carbuncle” [1]. According to modern medicine, asthmatic bronchitis usually occurs after upper respiratory tract infection, wherein the infection spreads to the bronchi, causing congestion and edema of the bronchial mucosa. The smooth muscle spasm of the wall, causing the narrowing of airway, is the main pathological mechanism. At the same time, the disease is also triggered by various factors, such as dust mites, house dust, pollen, mold, and other inhaled allergens; feather, paint, and other contact allergens; food allergens; and sports or physical factors [2]. In Western medicine, this disease is treated with anti-inflammatory, antispasmodic, and asthma-relieving medications. Although there are many methods of control, patients with asthmatic bronchitis are prone to repeated attacks and may develop side effects. Treating this disease with Chinese medicine has obvious curative effect, whether it is in relieving the symptoms of the attack or in improving the state of recurrence [3].

In this study, through TCM syndrome differentiation and classification of children with asthmatic bronchitis under the Pediatric Department of our hospital, the correlation between TCM syndrome types of pediatric asthmatic bronchitis and the influencing factors of asthmatic bronchitis in children was explored, so as to provide a clinical basis for treatment.

2. Materials and methods

2.1. General information

The clinical data of 197 children with asthmatic bronchitis admitted to our hospital from March 2021 to March 2022 were collected, referring to “Zhu Futang Practical Pediatrics” (7th Edition, 2002) and “Chinese Medicine Industry Standards – Standards for Diagnosis and Efficacy of Pediatric Diseases and Syndromes of Traditional Chinese Medicine (1994, State Administration of Traditional Chinese Medicine) for diagnosis, classification, and analysis of the influence of factors such as age, gender, birth status, delivery method, feeding method, genetic history, allergy history, *etc.*, on the diagnosis and syndrome types of traditional Chinese medicine (TCM).

Inclusion criteria: (i) complete clinical data, with informed consent obtained from parents; (ii) children under 3 years old; (iii) in compliance with “Zhu Futang Practical Pediatrics” (7th Edition, 2002) and “Chinese Medicine Industry Standards – Standards for Diagnosis and Efficacy of Pediatric Diseases and Syndromes of Traditional Chinese Medicine [4]” (1994, State Administration of Traditional Chinese Medicine). Exclusion criteria: (i) unstable patients or complicated with other diseases at the time of admission; (ii) patients with incomplete clinical data; (iii) patients with major organ dysfunction, such as heart, liver, and kidney, and patients uncooperative with laboratory examinations.

2.2. Methods

On the day when the children were admitted to the hospital, the items for analysis were collected according to the asthmatic bronchitis questionnaire, including the patients’ (i) general condition (age, gender, *etc.*), clinical symptoms, and clinical signs; (ii) past medical history (such as infantile diarrhea, eczema, allergic rhinitis, *etc.*); (iii) family history; and (iv) laboratory tests, in which 3 mL of peripheral blood was collected and centrifuged at a speed of 3000 r/min for 10 min, and the plasma was then separated to measure serum C-reactive protein (CRP) and serum amyloid A (SAA) by immunoturbidimetry, as well as serum procalcitonin (PCT) by emulsion-enhanced immunoturbidimetry. The tests were carried out on the same day the blood samples were drawn according to the operating specifications.

2.3. Statistical analysis

The collected data were sorted out as follows: recorded – organized – input – listed – statistically analyzed. SPSS 16.0 was used for processing; count data were expressed in percentage (%), and χ^2 /F-test was

performed.

3. Results

3.1. Distribution of TCM syndromes in children with asthmatic bronchitis

Among the 197 children with asthmatic bronchitis, the proportions of children cold asthma syndrome, heat asthma syndrome, mixed cold and heat syndrome, and mixed deficiency and excess syndrome accounted for 48.22%, 36.04%, 10.66%, and 5.08%, respectively, suggesting that the majority of children with asthmatic bronchitis have cold asthma syndrome (**Table 1**).

Table 1. Distribution of TCM syndromes in children with asthmatic bronchitis

TCM syndrome	Number of cases	Percentage (%)
Cold asthma	94	47.72
Febrile asthma	69	35.03
Mixed cold and heat	21	10.66
Mixed deficiency and excess	13	6.59

3.2. Correlation analysis of TCM syndrome types and influencing factors in children with asthmatic bronchitis

Among the 197 children, there were 143 males and 54 females; χ^2 test showed $P = 0.0439$ (< 0.05), suggesting that gender has a significant influence on the TCM syndromes of asthmatic bronchitis in children. Among the children, 77 cases were 0–1 year old, accounting for 39.08%; 69 cases were 1–2 years old, accounting for 35.02%; and 51 cases were 2–3 years old, accounting for 25.88%; χ^2 test showed $P > 0.05$, indicating no significant difference in the distribution of TCM syndromes of pediatric asthmatic bronchitis among the different age groups. There were 185 cases of full-term children, accounting for 93.91%, and 12 cases of premature children, accounting for 6.09%; χ^2 test showed $P > 0.05$, indicating that birth status has no effect on the distribution of TCM syndromes of asthmatic bronchitis in children. Among the cases, 94 children were delivered naturally, accounting for 47.72%, while 103 cases were delivered via cesarean section, accounting for 52.28%; χ^2 test showed $P > 0.05$, indicating that there is no correlation between the mode of delivery and the distribution of TCM syndromes in children with asthmatic bronchitis. The majority of children with cold asthma syndrome, heat asthma syndrome, and mixed cold and heat syndrome were not exclusively breastfed, and there was no significant difference in the feeding method of children with mixed deficiency and excess syndrome ($P > 0.05$). Among children with cold asthma syndrome, 21 cases had family history of asthma/allergy, whereas 73 cases had no family history of asthma/allergy; among children with heat asthma syndrome, 6 cases had family history of asthma/allergy, whereas 63 cases had no family history of asthma/allergy; among children with mixed cold and heat syndrome, 4 cases had family history of asthma/allergy, whereas 17 cases had no family history of asthma/allergy; among children with mixed deficiency and excess syndrome, 1 case had family history of asthma/allergy, whereas 12 cases had no family history of asthma/allergy; χ^2 test showed $P > 0.05$, indicating no significant correlation between the TCM syndromes of pediatric asthmatic bronchitis and family history of asthma/allergy. Among the 197 cases of asthmatic bronchitis, 78 had history of drug and food allergy, accounting for 39.59%, whereas 119 cases had no history of drug or food allergy, accounting for 60.41%; χ^2 test showed $P < 0.05$, suggesting a significant correlation between different TCM syndromes and history of drug and food allergy. In children with asthmatic bronchitis, the most common picture was normal or decreased eosinophils ($0 \leq E\% \leq 5\%$), and there was no significant difference among the syndromes ($P > 0.05$).

Table 2. Correlation between TCM syndromes and influencing factors in children with asthmatic bronchitis

		Cold asthma (94)	Heat asthma (69)	Mixed cold and heat (21)	Mixed deficiency and excess (13)	χ^2/F	<i>P</i>
Gender	Male	74	41	17	9	8.3139	0.0400
	Female	20	28	4	4		
Age	0–1 year old	43	22	7	5	8.8205	0.1839
	1–2 years old	24	29	11	5		
	2–3 years old	27	18	3	3		
Birth status	Full term	89	64	20	12	2.5570	0.0834
	Premature	5	5	1	1		
Mode of delivery	Vaginal delivery	45	31	12	6	0.9767	0.8069
	Caesarean section	49	38	9	7		
Feeding method	Breastfeeding	28	19	10	4	1.5822	0.2577
	Mixed feeding	50	43	9	4		
	Artificial feeding	16	7	2	5		
Family history of asthma/allergy	Yes	21	6	4	1	2.0481	0.0865
	No	73	63	17	12		
History of drug/food allergy	Yes	27	34	9	8	10.0594	0.0181
	No	67	35	12	5		
Percentage of eosinophils	Low	9	5	2	1	3.1174	0.0936
	Normal	59	44	12	10		
	High	26	20	7	2		

4. Discussion

Asthmatic bronchitis is a common respiratory disease in children, and it mostly occurs in infants and young children. In recent years, with the influence of environmental pollution, climate change, malnutrition, immune function deficiency, and other factors, the incidence of the disease is on the rise, and it has a tendency to affect younger children^[5]. The onset of this disease is related to the child's physiological make-up and the invasion of the human body by wind-cold, wind-heat, and dryness. As recorded in "On the Origin and Symptoms of Various Diseases," "For those with lung diseases, phlegm retention is in the lungs." According to "Pediatric Medicine and Syndrome Zhi Jue," "Those who cough with sputum retention, wheeze and cough with phlegm ringing, and even with mucus obstructing the heart orifices...the treatment should be to dissipate phlegm and detoxify. It should be based on clearing away heat and resolving phlegm^[6]." According to modern medicine, asthmatic bronchitis usually occurs after upper respiratory tract infection. When the infection spreads to the bronchus, it causes congestion and edema of the bronchial mucosa, spasm of the smooth muscle wall, and wheezing due to bronchial narrowing. This is the main pathological mechanism of asthmatic bronchitis. In order to find a safe and effective method of treatment, it is necessary to further study the TCM syndromes of this disease and the related factors.

Through statistical analysis of the clinical data of 197 inpatients with asthmatic bronchitis in our hospital, we aimed to provide an objective basis for determining the factors related to TCM syndromes of pediatric asthmatic bronchitis and to carry out standardized TCM diagnosis and treatment. The findings of this study are presented below.

- (i) Among the 197 children with asthmatic bronchitis, the majority of cases had cold asthma syndrome, accounting for 48.22%. Most of the patients are male, and although the disease can occur across all four

seasons, there are significant correlations with temperature changes, family history, previous medications, and food allergy history.

- (ii) Among the 197 children, 77 were 0–1 year old, accounting for 39.08%; 69 were 1–2 years old, accounting for 35.02%; and 51 were 2–3 years old, accounting for 25.88%; χ^2 test showed $P > 0.05$, indicating no significant difference in the distribution of TCM syndromes of asthmatic bronchitis in children among different age groups. There were 185 full-term children, accounting for 93.91%, and 12 premature children, accounting for 6.09%; χ^2 test showed $P > 0.05$, indicating that birth status has no effect on the distribution of TCM syndromes of pediatric asthmatic bronchitis. Among the children, 94 were delivered naturally, accounting for 47.72%, and 103 were delivered by cesarean section, accounting for 52.28%; χ^2 test showed $P > 0.05$, suggesting that there is no correlation between the mode of delivery and the distribution of TCM syndromes in children with asthmatic bronchitis. Children with cold asthma syndrome, heat asthma syndrome, and mixed cold and heat syndrome were not exclusively breastfed, and there was no significant difference in the feeding method of children with mixed deficiency and excess syndrome ($P > 0.05$). In terms of family history of asthma/allergy, 21 cases with cold asthma syndrome had family history, whereas 73 cases had no family history; 6 cases with heat asthma syndrome had family history, whereas 63 cases had no family history; 4 cases with mixed cold and heat syndrome had family history, whereas 17 cases had no family history; 1 case with mixed deficiency and excess syndrome had family history, whereas the other 12 cases had no family history; χ^2 test showed $P > 0.05$, indicating that there is no significant correlation between the TCM syndromes of asthmatic bronchitis in children and family history of asthma/allergy. Among the 197 children with asthmatic bronchitis, 78 cases had history of drug and food allergy, accounting for 39.59%, whereas 119 cases had no history of drug or food allergy, accounting for 60.41%; χ^2 test showed $P < 0.05$, suggesting a significant correlation between different TCM syndromes and history of drug and food allergy. A picture of normal or high eosinophil percentage is common in children with asthmatic bronchitis, and there was no statistically significant difference among the syndrome types in the present study ($P > 0.05$).

Due to the small number of cases in this study and the small sample size, there may be some deviations in the statistical results. We hope that the sample size and geographical scope will be further expanded in future studies to further clarify the pathogenesis and influencing factors of pediatric asthmatic bronchitis and the correlation with other TCM syndrome types, so as to provide a clinical basis for rescue work and effectively manage children with asthmatic bronchitis in clinical practice.

Disclosure statement

The authors declare no conflict of interest.

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