DOI: 10.53469/jcmp.2025.07(08).36

Research Progress in Integrated Chinese-Western Diagnosis and Treatment of Childhood Asthma During Remission

Chunyu Wei, Jin Shang, Anqing Guo, Hui Ding*

Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China
**Correspondence Author*

Abstract: ***Pediatric bronchial asthma is a heterogeneous disorder characterized by chronic airway inflammation, bronchial hyperresponsiveness, airflow limitation, and airway remodeling. Its cardinal manifestations include recurrent wheezing, coughing, dyspnea, and chest tightness, typically exacerbating nocturnally. While most pediatric patients achieve adequate disease control through standardized clinical management, untreated cases may persist into adulthood, leading to progressive pulmonary function decline and potential mortality. Beyond conventional pharmacotherapies-including bronchodilators, corticosteroids, immunosuppressants, and antihistamines-integrating traditional Chinese medicine (TCM) significantly reduces attack frequency, alleviates clinical symptoms, improves lung function, and enhances therapeutic efficacy. This review synthesizes recent advances in TCM etiology, pathogenesis, and syndrome-differentiation-based treatment for pediatric asthma during remission, alongside contemporary Western medical perspectives on epidemiology, diagnostic criteria, pathogenic mechanisms, and pharmacologic interventions. Our objective is to provide a theoretical foundation and clinical guidance for optimizing therapeutic strategies and improving long-term prognoses.***

Keywords: Pediatric Bronchial Asthma, Remission Phase, Integrative Medicine, Clinical Management, Pharmacotherapy.

1. Introduction

Bronchial asthma, a prevalent chronic respiratory disorder in pediatric populations, is pathologically characterized by airway hyperresponsiveness, inflammatory cascades, and structural remodeling. Clinically, it manifests as recurrent wheezing, dyspnea, chest tightness, and cough [1,2]. According to the Chinese Guidelines for Pediatric Asthma Diagnosis and Management (2025) [3], China currently has 8.69 million children and adolescents affected by asthma. Epidemiological surveillance indicates that the prevalence among urban children aged 0-14 years was 3.02% in 2010, with a progressive upward trajectory observed in recent years [4]. This trend is attributed to multifactorial etiologies including genetic predisposition, environmental triggers, respiratory infections, and neuroregulatory dysfunction. Conventional Western pharmacotherapy employs bronchodilators, corticosteroids, immunosuppressants, antihistamines, and biologics. Within the framework of traditional Chinese medicine (TCM), pediatric asthma corresponds to "Xiao Zheng" (wheezing syndrome) or "Chuan Zheng" (dyspnea syndrome). TCM pathogenesis stratifies the condition into acute exacerbation phases-primarily driven by wind pathogens compounded by cold, heat, or dryness-and remission phases involving deficiency patterns of the lung, spleen, and kidney systems. Therapeutic principles emphasize addressing branch aspects during acute exacerbations while targeting root causes in remission [5]. This review critically examines the etiopathogenesis of pediatric asthma during remission, proposing that syndrome-differentiation-guided TCM combined with Western interventions enhances pulmonary function, reduces adverse events, and improves clinical efficacy. Our synthesis aims to inform evidence-based therapeutic optimization and guide clinical decision-making for remission-phase management.

2. Advancements in Chinese Medicine Research for Pediatric Bronchial Asthma

2.1 Etymological Evolution of Disease Nomenclature

The Yellow Emperor's Inner Canon (Huangdi Neijing) documented respiratory manifestations such as "chuan he" (panting with gurgling) and "chuan ming" (wheezing sounds), establishing foundational concepts for later nosological identification of asthma, though without explicit disease nomenclature [6]. Zhang Zhongjing's Essential Prescriptions from the Golden Cabinet (Jingui Yaolüe) specified acoustic characteristics during acute exacerbations: "Cough with dyspnea and throat gurgling like waterfowl-treat with Shegan Mahuang Decoction" [7]. The term "xiao chuan" (asthma) first appeared in Danxi's Mastery of Medicine (Danxi Xinfa) during the Jin-Yuan dynasties, which systematically synthesized its etiology, pathogenesis, and therapeutic principles [8]. Yu Tuan's Orthodox Medical Record (Yixue Zhengzhuan) in the Ming Dynasty distinguished: "Xiao denotes audible whistling; chuan refers to labored breathing" [9]. By the Ming-Qing period, Secret Diagnostics for Essential Treatments (Mizhuan Zhengzhi Yaojue) described: "Wheezing disorders manifest as duck-like laryngeal stridor radiating to the chest and back, breathlessness, and orthopnea-often with latent predisposition triggered by environmental changes" [10], marking the maturation of the "su gen" (latent pathogenic factor) theory. Pediatric Insights (Youke Fahui) further noted: "Recurrent attacks with intercritical remission signify an entrenched disorder" [11], a view corroborated by Hou Shuping's clinical observation of the condition's refractory nature [12].

2.2 Etiology and Pathogenesis

Pediatric bronchial asthma during acute exacerbations follows

the pathogenesis pattern of "wind pathogen as the initiating factor with cold/heat/dryness as secondary manifestations", where "wind-induced phlegm ascent" constitutes the core mechanism. In remission, the principal etiology involves "triple-deficiency interplay (lung-spleen-kidney)". Therapeutic principles equally emphasize pathogen elimination and vital qi reinforcement: acute phases prioritize pathogen clearance, while remission focuses on constitutional fortification. As stated in Spiritual Pivot·Essential Spirit (Lingshu·Benshen): "Lung qi deficiency manifests as nasal obstruction and dyspnea; excess causes gasping with chest distension" [13]. Feng Xinran et al. attribute vulnerability to exogenous pathogens (cold/heat/dryness) to lung deficiency impairing defensive qi. This disrupts pulmonary dispersion and descent functions, leading to phlegm accumulation-consistent with Systematic Differentiation of Warm Diseases·Pediatric Principles: "Children's delicate viscera and compromised defenses facilitate pathological transmission; their fragile constitution heightens susceptibility" [13]. Chen Mei et al. identify inherent pediatric spleen deficiency as impeding transportation-transformation, causing dietary injury and damp-phlegm generation through impaired qi activity. Subsequent earth-metal axis disruption weakens lung qi defenses, activating latent phlegm upon pathogen exposure-exemplifying the classical axiom: "Spleen generates phlegm; lung stores it" [14]. Treatment Differentiation by Category·Dyspnea Syndromes further clarifies: "Lung governs qi movement; kidney anchors qi reception. Their synergy enables harmonious respiration." Thus, kidney deficiency causes failure in qi reception, preventing lung qi descent and yin-yang balance, resulting in recurrent wheezing [15]. Li Mengxue et al. demonstrate that spleen-kidney yang deficiency impairs fluid metabolism, provoking upward damp-phlegm reflux that disrupts assimilation and perpetuates asthmatic recurrence [15].

2.3 Chinese Medicine Therapeutics for Remission Phase

Internal therapy represents the primary modality in Chinese medicine for disease management. During remission, deficiency patterns predominate, most notably lung-spleen qi deficiency pattern, kidney yang deficiency pattern, and lung-kidney yin deficiency pattern. Constitutional regulation through syndrome-differentiation-guided herbal protocols constitutes the therapeutic cornerstone, targeting root-pathogenesis resolution to mitigate recurrence risk and restore functional equilibrium.

2.3.1 Classical Formula Therapeutics

For lung-spleen qi deficiency, evidence-based classical formulas include Yupingfeng San (Jade Screen Powder) and Liujunzi Tang (Six Gentlemen Decoction). Yupingfeng San, documented in Danxi's Mastery of Medicine, comprises Astragali Radix (Huangqi), Saposhnikoviae Radix (Fangfeng), and Atractylodis Macrocephalae Rhizoma (Baizhu) to fortify qi and consolidate the exterior. Liujunzi Tang from Orthodox Medical Record resolves dampness, transforms phlegm, and reinforces spleen qi. Dong Xiaobo's randomized controlled trial (1:1 allocation) in pediatric asthma with lung-spleen deficiency demonstrated superior total response rate in the intervention group (conventional pharmacotherapy plus Yupingfeng San-Liujunzi Tang integration) versus controls (Western drugs alone) after 3-month treatment. The formula significantly reduced eosinophil counts (EOS), tumor necrosis factor-α (TNF-α), immunoglobulin E (IgE), and TCM symptom scores-confirming anti-inflammatory efficacy and clinical improvement [16].

For spleen-kidney yang deficiency, Jingui Shenqi Wan (Golden Cabinet Kidney Qi Pill) from Essential Prescriptions from the Golden Cabinet-containing Aconiti Lateralis Radix Praeparata (Fuzi), Rehmanniae Radix Praeparata (Shudihuang), Dioscoreae Rhizoma (Shanyao), Poria (Fuling), Alismatis Rhizoma (Zexie), Moutan Cortex (Mudanpi), Cinnamomi Ramulus (Guizhi), Zingiberis Rhizoma Recens (Shengjiang), and Jujubae Fructus (Dazao)-warms kidney yang and regulates water metabolism. Jiang Zhuxiu et al. verified its airway anti-inflammatory effects in yang-deficient asthmatic rats via Notch1 signaling-mediated Th1/Th2 immune rebalancing [16]. Guo Xiang et al. further demonstrated its inhibition of ferroptosis through MUC5AC/EGFR pathway modulation in kidney yang deficiency models [17].

Regarding lung-kidney yin deficiency, Wang Ting et al. attribute its pathogenesis to chronic lung yin consumption disrupting metal-water mutual promotion ("mother-organ affliction involving offspring-organ" per five-phase theory), ultimately causing dual deficiency. Modified Maiwei Dihuang Wan (Ophiopogon-Schisandra Rehmannia Pill) is indicated to nourish yin, astringe lung qi, and promote renal reception [18].

2.3.2 Expert Empirical Formulas

Insights on Syndrome Management (Zhengzhi Xinde) distinguishes two etiologies for deficient-type dyspnea, one originating from lung-spleen systems [19]. Professor Huang Chunxia's protocol for lung-spleen qi deficiency asthma integrates qi-fortification, phlegm-resolution, and blood-activation principles. Her formulated Qiling Zhixiao Formula-comprising Astragali Radix (Huangqi), Poria (Fuling), Dioscoreae Rhizoma (Shanyao), Coicis Semen (Yiyiren), Atractylodis Macrocephalae Rhizoma (Baizhu), Saposhnikoviae Radix (Fangfeng), Citri Reticulatae Pericarpium (Chenpi), fried Perillae Fructus (Zisuzi), Schisandrae Fructus (Wuweizi), Chuanxiong Rhizoma (Chuanxiong), and Glycyrrhizae Radix (Gancao)-combined with montelukast chewable tablets demonstrated superior outcomes versus montelukast monotherapy. The intervention group exhibited significantly higher clinical response rates, reduced TCM symptom scores (individual and total), improved pulmonary function (FEV1, PEF), decreased peripheral eosinophil percentages, and enhanced Childhood Asthma Control Test scores, confirming therapeutic efficacy and safety [20]. While warming yang and replenishing qi constitutes the conventional approach for kidney yang deficiency asthma, Zhang Fengchun's Wenyang Yiqi Formula significantly lowered TCM symptom scores, IL-4, and IgE levels post-treatment [21]. Ding Shan et al. further validated the anti-inflammatory and lung function-improving effects of Bufei Yishen Pingchuan Formula in pediatric asthma with lung-kidney yin deficiency during persistent status [22].

2.3.3 External Therapies

As asserted in Systematic Differentiation of External Therapies (Li Yue Pianwen): "The principles governing external therapies mirror those of internal treatments; their medicinals are identical-only application methods differ, yielding extraordinary therapeutic versatility." Beyond oral pharmacotherapy, Chinese medicine emphasizes the adjuvant role of external modalities in pediatric asthma management [23]. Key techniques include acupoint application, acupuncture, tuina massage, cupping, guasha scraping, auricular acupressure, and catgut embedding. These approaches enhance treatment compliance, reduce pharmaceutical reliance, and improve quality of life through both targeted symptom intervention and spleen-stomach functional restoration [23].

3. Current Research Landscape in Western Medicine for Pediatric Bronchial Asthma

3.1 Epidemiological Profile

Pediatric bronchial asthma manifests significant heterogeneity across age groups, genders, geographic regions, and seasons. According to the 2013 Third National Urban Pediatric Asthma Survey [4], the overall prevalence among Chinese children aged 0-14 years was 3.02%, comprising classic asthma (2.72%) and cough-variant asthma (0.29%). Prevalence was markedly higher in males (3.51%) than females (2.29%), peaking in preschoolers (3-5 years: 4.15%) versus school-aged children (6-14 years: 2.82%) and infants (0-2 years: 1.77%) [24,25]. Significant regional variations were observed, with East China exhibiting the highest prevalence (4.23%) and Northeast China the lowest (2.00%). City-level analysis revealed Shanghai had the maximal rate (7.57%) while Lhasa showed the minimal incidence (0.48%) [24]. Sourangsu Chowdhury et al. further established significant positive correlations between traffic related NO2/PM2.5 exposure and pediatric asthma incidence [26].

3.2 Diagnostic Criteria

Per the Chinese Guidelines for Pediatric Asthma Diagnosis and Management (2025) [27], diagnosis necessitates: (1) recurrent respiratory symptoms (wheezing, cough, dyspnea, chest tightness) with documented variability; (2) ≥1 risk factor (asthma family history, allergic comorbidity, or prior wheezing episodes); and (3) objective assessments including pulmonary function tests (e.g., FEV1/FVC ratio), allergen sensitization panels, and fractional exhaled nitric oxide (FeNO) measurement. Pulmonary function testing serves as a cornerstone diagnostic tool for children >5 years, whereas clinical presentation and medical history corroboration remain primary for those <5 years due to physiologically immature lung development.

3.3 Pathogenic Mechanisms

Current evidence confirms asthma pathogenesis involves allergic predisposition, elevated IgE levels, and dysregulated Th2 cytokine production. Genome-wide association studies (GWAS) by Ji Wang et al. identified multiple susceptibility loci (e.g., FLG, ORMDL3, IL33, HLA-DR/DQ) while demonstrating maternal mitochondrial inheritance of asthma risk through mtDNA variant-mediated immune dysregulation [28]. Nicole Akar-Ghibril et al. characterized the Th2-hyperresponsive phenotype in allergic asthma by elevated eosinophils (blood/sputum), increased fractional exhaled nitric oxide (FeNO), and upregulated periostin in adults [29]. Environmental triggers-including air pollutants, allergen exposure, and respiratory infections-damage airway epithelium, inducing release of epithelial-derived cytokines and growth factors that drive downstream inflammatory cascades [24,30-32]. Aberrant neurotransmitter release (histamine, serotonin, epinephrine) further contributes to bronchospasm and airway hyperresponsiveness [33,34]. Emerging evidence implicates insulin resistance [35], dyslipidemia [36], microbiota dysbiosis [34,37], and vitamin A/D deficiency [38] as significant risk modifiers.

3.4 Western Medical Management

Per the Chinese Guidelines for Pediatric Asthma Diagnosis and Management (2025) [39], remission-phase therapeutic objectives prioritize sustained clinical control, reduced exacerbation frequency, enhanced quality of life, and prevention of disease progression. Pharmacotherapeutic strategies encompass bronchodilators, corticosteroids, immunosuppressants, and antihistamines. Beyond conventional agents, novel biologics have emerged: Omalizumab attenuates mast cell (MC) activation and histamine release, while Tezepelumab disrupts the epithelial-MC axis to indirectly suppress mediator release (e.g., histamine), thereby mitigating airway hyperresponsiveness [34].

3.5 Integrated Chinese and Western Medical Therapy

3.5.1 Earth-Fortifying Metal-Generating Therapy Combined with Western Pharmacotherapy

Shen Na et al. conducted a randomized controlled trial (RCT) in 240 pediatric patients with lung-spleen qi deficiency asthma comorbid with allergic rhinitis [39]. Participants were equally allocated to control (montelukast + baseline treatment) and intervention groups (additional Yupingfeng San). The combination group demonstrated significantly reduced symptom severity, enhanced pulmonary function, and superior clinical response rates versus montelukast monotherapy. In a parallel RCT by Gao Guiling [40], 80 children with lung-spleen deficiency asthma in remission received either fluticasone propionate alone (control) or combined with Shenling Baizhu San (intervention). The integrated therapy group exhibited significantly decreased exacerbation frequency, shorter duration per episode, and greater TCM symptom score reduction, confirming synergistic therapeutic enhancement.

3.5.2 Origin-Fortifying Earth-Supporting Therapy Combined with Western Pharmacotherapy

Wang Yongjian et al. [41] enrolled 70 asthma patients with spleen-kidney yang deficiency (35 per group). Compared to conventional Western treatment alone, the integrated therapy group demonstrated lower TCM symptom scores, shorter time to symptom relief and cough resolution, and higher

pulmonary function parameters (PEF and FEV1). These outcomes confirm enhanced efficacy for spleen-kidney yang deficiency variant asthma. In Lu Qingfang et al.'s trial [42] with 80 similar patients, both salmeterol/fluticasone monotherapy and combination with Peiyuan Butu acupuncture improved FEV1/FVC, PEF, CRP, and IgE levels. The acupuncture group showed greater reductions in these parameters alongside improved clinical symptoms and pulmonary function, demonstrating significant anti-inflammatory effects.

3.5.3 Metal-Water Mutual-Promotion Therapy Combined with Western Pharmacotherapy

Lin Weijin [43] clinically compared inhaled budesonide monotherapy versus combined therapy with oral Maiwei Dihuang Wan plus budesonide in cough-variant asthma. The integrated approach demonstrated enhanced pulmonary function (elevated PEF and FEV1) and effective cough symptom resolution. In Xu Jing et al.'s trial [44] with 60 pediatric asthma patients exhibiting lung-kidney yin deficiency during chronic persistence, both groups received fluticasone propionate, while the intervention group received additional Zuogui Wan. The combination group showed superior outcomes across multiple parameters including reduced asthma attack frequency, shorter episode duration, and improved constitutional metrics.

4. Conclusion

Pediatric bronchial asthma prevalence in China continues its upward trajectory, driven by environmental and genetic determinants. Early diagnosis and intervention remain critical for improving quality of life. During acute exacerbations, Western medicine prioritizes bronchospasm relief, inflammation control, and ventilation improvement, while Chinese medicine focuses on addressing branch manifestations. In remission, conventional management employs corticosteroids to maintain disease control and prevent exacerbations, whereas Chinese medicine adopts a root-level approach through lung-spleen-kidney axis regulation via pulmonary fortification, spleen-tonification, and kidney reinforcement. This dual strategy reduces attack frequency and ameliorates clinical symptoms. Integrated therapy offers distinct advantages: it combines holistic regulation with personalized treatment guided by syndrome differentiation during remission, demonstrating superior safety profiles versus Western monotherapy. Clinical evidence confirms significant improvements in TCM symptom scores, inflammatory biomarkers, and pulmonary function parameters. Collectively, these findings position the combination of foundational Western pharmacotherapy with TCM-driven viscera functional regulation as a highly promising therapeutic paradigm for pediatric asthma remission management.

References

[1] Xu Shengjie, Panettieri Reynold A, Jude Joseph. Metabolomics in asthma: A platform for discovery. [J]. Molecular aspects of medicine, 2021, (prepublish): 100990-100990.

[2] Chetta Alfredo, Calzetta Luigino. Bronchial asthma: an update. [J]. Minerva Medica, 2021, 113(1)

[3] China Medicine Education Association Pediatric Professional Committee, Chinese Medical Association Pediatrics Branch Respiratory Group Asthma Cooperative Group, Chinese Medical Doctor Association Respiratory Physician Branch Pediatric Respiratory Working Committee, et al. Guidelines for the Diagnosis and Prevention of Bronchial Asthma in Children (2025 Patient and Public Version) [J]. Chinese Journal of Applied Clinical Pediatrics, 2025, 40(5): 324-332. [in Chinese]

[4] National Cooperative Group on Childhood Asthma, Institute of Environmental Health and Related Product Safety, Chinese Center for Disease Control and Prevention, et al. The Third Nationwide Survey of Childhood Asthma in Urban Areas of China [J]. Chinese Journal of Pediatrics, 2013, 51(10): 729-734. PMID: 24406225. DOI: 10.3760/cma.j.issn.0578-1310.2013. 10.006. [in Chinese]

[5] ZHOU Qi, YANG Yong, ZHANG Yunxia, et al. Research Progress on Traditional Chinese Medicine for Chronic Persistent Stage of Bronchial Asthma [J]. Journal of Shaanxi University of Chinese Medicine.

[6] TIAN Dong, XI Chongcheng, HUANG Junwei, et al. Exploring the Correlation between Asthma and Kidney from Huangdi Neijing [J]. Jilin Journal of Chinese Medicine, 2021, 41(4): 421-423.

[7] FANG Li, LI Zegeng, WANG Chuanbo, et al. Textual Research on Internal Medicine Diagnosis and Treatment of Xiaobing (Asthma Syndrome) [J]. Journal of Practical Traditional Chinese Internal Medicine, 2021.

[8] ZHAO Dongkai, LI Ruonan, LIU Junnan, et al. Analysis of Asthma from Danxi's Heart Method [J]. Journal of Changchun University of Chinese Medicine, 2023, 39(6): 602-604.

[9] JIA Yangmin, SONG Kang, et al. Traditional Chinese Medicine Understanding of Asthma [J]. Guangming Journal of Chinese Medicine, 2010, 25(5): 782-782.

[10] XING Qiongqiong, ZHOU Rongyi, XI Leying, et al. Application of Latent Root Theory in Asthma Pathogenesis [J]. Journal of Nanjing University of Chinese Medicine, 2024, 40(06): 645-651.

[11] YAO Bing, XIE Jing, WANG Mengqing, et al. Exploration of TCM Three-Level Prevention for Virus-Induced Asthma in Children Based on Latent Phlegm Theory [J]. Journal of Hunan University of Chinese Medicine, 2025, 45(01): 115-118.

[12] HOU Shuping. Origin and Academic Debates of Asthma Theory [C]. Proceedings of the 25th National Pediatric Conference of Chinese Medicine & Teaching Seminar of Chinese Medicine Higher Education Pediatrics Committee, 2007.

[13] FENG Xinran, WANG Xuefeng. Overview of TCM Treatment for Bronchial Asthma in Children [J]. Liaoning Journal of Traditional Chinese Medicine, 2025, 52(2): 204-206.

[14] CHEN Mei, WANG Qili, LIU Liwei. Professor SHENG Lixian's Experience in Treating Pediatric Allergic Rhinitis with Lung-Spleen Yang Deficiency Syndrome Using Qiling Decoction [J]. Journal of Pediatrics of Chinese Medicine, 2025, 21(04): 11-13.

[15] LI Mengxue, LI Zheng, SHI Zhenggang. Research on Mechanism of TCM in Treating Pediatric Asthma in Remission Stage [J]. Journal of Pediatrics of Chinese Medicine, 2025, 21(04): 97-101.
[16] JIANG Zhuxiu, LI Minjing, ZHENG Xiaowei, et al. Effect of Modified Jin Gui Shen Qi Pill on Th1/Th2 Immune Imbalance in Kidney Yang Deficiency Asthmatic Rats via Notch Signaling Pathway [J]. New Chinese Medicine, 2025, 57(06): 170-175.
[17] GUO Xiang, SONG Hong, CHEN Jiahao, et al. Mechanism of Modified Jin Gui Shen Qi Pill Regulating MUC5AC/EGFR Pathway to Intervene Ferroptosis and Improve Asthma in Rats with Kidney Yang Deficiency Syndrome [J]. Journal of Zhejiang Chinese Medical University, 2024, 48(11): 1334-1343.
[18] WANG Ting, XIE Jing. Research Progress on TCM Treatment of Asthma in Children during Remission Stage [J]. Guangming Journal of Chinese Medicine, 2023, 38(10): 2014-2016.
[19] HUANG Shuran, YAO Hongfeng, DING Haiba, et al. Efficacy of Shen Ling Bai Zhu Powder Combined with Salmeterol/Fluticasone in Chronic Persistent Stage of Bronchial Asthma and Its Effect on Oxidative - Antioxidant Balance [J]. Shaanxi Journal of Traditional Chinese Medicine, 2023, 44(06): 730-733+737.
[20] ZHANG Fengya. Clinical Observation of Qiling Zhixiao Formula for Treating Lung-Spleen Qi Deficiency Syndrome in Children with Asthma during Remission Stage [D]. 2021.
[21] ZHANG Fengchun, WANG Chengjuan. Efficacy Analysis of Self-Prescribed Wenyang Yiqi Formula for Bronchial Asthma [J]. Chinese Community Physicians, 2024, 40(09): 113-114.
[22] DING Shan, FANG Sheng, LI Haijiao. Clinical Study of Bufei Yishen Pingchuan Formula for Treating Asthma Status in Children with Lung-Kidney Yin Deficiency Syndrome [J]. New Chinese Medicine, 2020, 52(11): 81-84.
[23] JIANG Ling, ZHANG Di, LIU Ying. Research Progress on External TCM Therapies for Pediatric Asthma [J]. Practical Clinical Journal of Integrated Traditional Chinese and Western Medicine, 2025, 25(11): 125-128.
[24] LIU Chuanhe, SHAO Mingjun, WANG Qiang. The Third Nationwide Survey of Childhood Asthma in Urban Areas of China [C]. Proceedings of the 18th National Pediatric Conference of Chinese Medical Association, 2013: 7.
[25] SUN Haiying. Construction and Application of Family Care Program for Preschool Asthma Children Based on Family Empowerment Model [D]. 2024.
[26] CHOWDHURY S, HAINES A, KUMAR V, et al. Global and national assessment of the incidence of asthma in children and adolescents from major sources of ambient NO2 [J]. 2021.
[27] SUBSPECIALTY GROUP OF RESPIRATORY T S O P, CHINESE MEDICAL ASSOCIATION, EDITORIAL BOARD C J O P, PEDIATRICS C M E A C O. [Guidelines for the diagnosis and optimal management of asthma in children (2025)] [J]. Zhonghua er ke za zhi = Chinese journal of pediatrics, 2025, 63(4): 324-37.
[28] Ji W, Yumei Z, Honglei Z, et al.Pathogenesis of allergic diseases and implications for therapeutic interventions. [J]. Signal transduction and targeted therapy, 2023, 8(1): 138-138.
[29] AKAR-GHIBRIL N, CASALE T, CUSTOVIC A, et al. Allergic Endotypes and Phenotypes of Asthma [J]. The Journal of Allergy and Clinical Immunology: In Practice, 2020, 8(2): 429-40.
[30] ZHAO Mengya, LIU Chuanhe. Clinical Status and Research Progress in Asthma Diagnosis in Young Children [J]. Chinese Journal of Medicine, 2016, 51(11): 3-5.
[31] BONSER L R, ERLE D J. The airway epithelium in asthma [J]. Adv Immunol, 2019, 142: 1-34.
[32] NOUREDDINE N, CHALUBINSKI M, WAWRZYNIAK P. The Role of Defective Epithelial Barriers in Allergic Lung Disease and Asthma Development [J]. J Asthma Allergy, 2022, 15: 487-504.
[33] CUI Ruirong. Advances in Pathogenesis of Bronchial Asthma in Children [J]. Chinese Journal of Rural Medicine and Pharmacy, 2017, 24(15): 78-80.
[34] BRADDING P, PORSBJERG C, CôTé A, et al. Airway hyperresponsiveness in asthma: The role of the epithelium [J]. J Allergy Clin Immunol, 2024, 153(5): 1181-93.
[35] BARTZIOKAS K, PAPAIOANNOU A I, DRAKOPANAGIOTAKIS F, et al. Unraveling the Link between Insulin Resistance and Bronchial Asthma [J]. Biomedicines, 2024, 12(2).
[36] LI W J, ZHAO Y, GAO Y, et al. Lipid metabolism in asthma: Immune regulation and potential therapeutic target [J]. Cell Immunol, 2021, 364: 104341.
[37] YU Lei, WU Maolan, ZHENG Xiangrong. Research Progress on Gut Microbiota and Bronchial Asthma in Children [J]. Chinese Journal of Contemporary Pediatrics, 2025, 27(05): 623-627.
[38] LIU Rui, HE Lijun, ZHOU Zhanqiang, et al. Vitamin A and D Status in Children with Bronchial Asthma and Effect of Vitamin D Adjuvant Therapy on Pulmonary Function [J]. Guizhou Medical Journal, 2025, 49(06): 914-916.
[39] SHEN Na, LIU Ling, WANG Cheng, et al. Efficacy of Yupingfeng Granules Combined with Montelukast Sodium in Treating Allergic Asthma with Allergic Rhinitis in Children with Lung-Spleen Qi Deficiency Syndrome [J]. Chinese and Foreign Medical Research, 2025, 4(14): 100-102.
[40] GAO Guiling. Effect of Shenling Baizhu Powder Adjuvant Fluticasone Propionate Aerosol in Asthmatic Children with Lung-Spleen Qi Deficiency Syndrome during Remission Stage [J]. Clinical Medicine, 2022, 42(08): 115-117.
[41] WANG Yongjian, SONG Xiaoqiong. Clinical Observation on Integrated Chinese and Western Medicine for Cough Variant Asthma with Spleen-Kidney Yang Deficiency Syndrome [J]. Shenzhen Journal of Integrated Traditional Chinese and Western Medicine, 2021, 31(13): 100-102.
[42] LU Qingfang, FANG Jia, HUANG Yanghua, et al. Clinical Observation of Peiyuan Butu Acupuncture Combined with Salmeterol/Fluticasone for Bronchial Asthma with Spleen-Kidney Yang Deficiency Syndrome [J]. China's Naturopathy, 2024, 32(15): 75-78.

[43] LIN Weijin, LIU Shengjun, ZHENG Jian. Treatment of 30 Cases of Cough Variant Asthma with Maiwei Dihuang Pill Combined with Budesonide [J]. Journal of Emergency in Traditional Chinese Medicine, 2010, (11): 1870-1871.
[44] XU Jing. Clinical Study of Modified Zuogui Pill Combined with Fluticasone for Lung-Kidney Yin Deficiency in Children with Chronic Persistent Asthma [D]. 2024.