

# Childhood psoriasis: a study of 137 cases from central China

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**Background:** Childhood psoriasis is common, but it has not been adequately reported in China. This study was undertaken to evaluate the epidemiological and clinical findings in children with psoriasis treated in a 9-year period and to compare the data with those from other studies.

**Methods:** The data were from 137 children ( $\leq 14$  years old) with psoriasis registered in two tertiary hospitals in Wuhan, China between January 2000 and December 2008. They were retrospectively studied.

**Results:** Of the 137 patients, aged between 3 and 14 years, 64 were males (46.7%) and 73 females (53.3%). Eleven patients (8%) had a family history of psoriasis. Infection was the most common precipitating factor (39, 28.5%). Seasonal influence was found in 57 patients (41.6%). Exacerbations in winter and spring were noted in 29 and 16 patients respectively. Plaque psoriasis was the most common type (72 patients, 52.6%), followed by guttate psoriasis (35, 25.5%), psoriasis pustulosa (15, 10.9%), and psoriasis erythroderma (7, 5.1%). The scalp was the most common initial site affected (69, 50.3%). Nail changes were found in 35 patients (25.5%), but no mucosal involvements were observed. Five patients had arthralgia and two showed abnormal X-ray appearance. Most of the affected children had pruritus. The co-morbidities of childhood psoriasis included allergic contact dermatitis (31, 22.6%), eczema (6, 4.3%), vitiligo (5, 3.6%), and alopecia areata (3, 2.2%). Psoriasis was sometimes misdiagnosed as dermatitis seborrheica (11, 8.0%), neurodermatitis (9, 6.6%) and balanitis (7, 5.1%). Some patients were treated with steroids, but there were obvious side-effects after long-term administration. Thiamphenicol was effective in the

treatment of refractory psoriasis pustulosa in children.

**Conclusions:** Our findings differ from those of previous studies, showing a lower rate of family history and a higher incidence of severe psoriasis. Differential diagnosis should be made especially when lesions occur at the scalp, elbow or balanus. Allergic contact dermatitis takes place more frequently in children with psoriasis than in normal children. Systemic corticosteroids should not be routinely used and other safer and more effective treatments are needed for severe cases.

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**Key words:** childhood psoriasis; outcome; steroid

## Introduction

Psoriasis is a common inflammatory cutaneous disease with unknown etiology. It is characterized by erythematous papules and plaques covered with silvery scale. The incidence of psoriasis among dermatological patients in childhood and adolescence was 3.8%.<sup>[1]</sup> In fact, the actual incidence of childhood psoriasis is much higher than that reported as many adult patients with onset of the disease before the age of 15 did not seek any medical help.<sup>[2]</sup> Yet there are few epidemiologic studies on childhood psoriasis in China. We retrospectively analyzed the data from 137 children with psoriasis aged less than 14 years who were treated in two tertiary hospitals in Wuhan, China between January 2000 and December 2008. The disease of the patients was confirmed morphologically or histopathologically when it was in doubt. The data included clinical characteristics, family history, misdiagnosis, associated disorders, treatment and outcomes.

## Methods

### Subjects

A total of 137 patients with psoriasis (64 boys and 73 girls) were treated and followed up at Wuhan No

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1 Hospital and Affiliated Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China between 2000 and 2008. All patients with psoriasis met the criteria for the diagnosis of psoriasis. The data were extracted from the medical records, including 1) epidemiological data: age, gender, seasonal influence, familial incidence and possible triggering factors; 2) clinical features: clinical types of psoriasis, presenting sites, subjective symptoms, koebner's phenomenon, types of nail change, mucosa and joint involvements, associated disorders and misdiagnosis; 3) laboratory investigations: blood routine, urine routine, aspartate aminotransferase, alanine aminotransferase,  $\gamma$ -globulin, erythrocyte sedimentation rate (ESR), anti-streptolysin O (ASO) titre, C-reactive protein (CRP), and throat swab culture; 4) treatments and outcomes: modalities and effectiveness, side-effects of treatment.

### Statistical analysis

Quantitative data were expressed as means and categorical variables were described as percentages and then analyzed with the Chi-square test, Fisher's exact test or Student's *t* test.  $P < 0.05$  was regarded statistically significant.

## Results

### Epidemiological investigation

Of the 137 patients, 64 (46.7%) were boys and 73 (53.3%) were girls, with a male to female ratio of 1:1.14. The mean age of boys and girls at presentation was 11.4 years and 8.9 years respectively. There was a significant difference in their age ( $P < 0.05$ , Table 1). Seasonal influence was observed in 57 patients (41.6%). Exacerbations of the disease in winter and spring were noted in 29 and 16 patients respectively. Fewer exacerbations in summer and autumn were seen in 9 and 3 patients respectively. Upper respiratory tract infection (39, 28.5%) was the most frequently suspected triggering factor, followed by psychological stress (7, 5.1%) and trauma (4, 2.9%). Eleven patients with plaque psoriasis had a family history.

### Clinical investigation

In this study, plaque psoriasis was the most common type (72 patients, 52.6%), followed by guttate psoriasis (35, 25.5%), psoriasis pustulosa (15, 10.9%), and then psoriasis erythroderma (7, 5.1%). Seborrheic dermatitis-like eruptions, annular lesions and diaper rashes were few in this cohort. The scalp was the most common initial site affected (69, 50.3%), followed by the extremities and trunk. In psoriasis pustulosa,

palmoplantar pustulosa was seen in 3 patients (2.2%). Nail involvements were seen in 35 patients (25.6%), in whom 31 (22.6%) had pitting, followed by ridging and discoloration. There were five patients with obvious arthralgia. X-ray findings were abnormal in two children. Pruritus was seen in 83 children (60.6%). Other subjective symptoms were burning (9, 6.6%), irritation (11, 8.0%), and dry feelings (7, 5.1%). Koebnerization was observed in 28 patients (20.4%). None of the patients had mucosal problems. The comorbidities included allergic contact dermatitis (31 patients, 22.6%), eczema (6, 4.3%), vitiligo (5, 3.6%), alopecia areata (3, 2.2%), systemic lupus erythematosus (1, 0.7%), bronchial asthma (1, 0.7%), and hepatitis (1, 0.7%). Childhood psoriasis was sometimes misdiagnosed as dermatitis seborrheica (11, 8.0%), neurodermatitis (9, 6.6%) and balanitis (7, 5.1%). The comparison of clinical features in boys and girls is shown in Table 2.

### Laboratory investigation

Thirty-two (23.4%) of the patients had leucocytosis. The levels of AST, ALT or  $\gamma$ -globulin were abnormal in 13 patients (9.5%). Streptococcal infection was confirmed by throat swab culture in 23 patients (16.8%). ASO titre was higher than normal in 38 patients (27.7%), ESR levels were increased in 43 patients (31.4%), and CRP was increased in 31 patients (22.6%).

### Treatments and outcome

In the present study, 36 children with psoriasis pustulosa, psoriasis erythroderma, or severe skin and joint involvement of psoriasis vulgaris received corticosteroid therapy (1-2 mg/kg per day). Various

**Table 1.** Presenting age and sex distribution of 137 children with psoriasis in central China

Variables	0-5 ( $\leq 5$ ) y	6-10 ( $\leq 10$ ) y	11-14 ( $\leq 14$ ) y	Mean age (y)
Total	8	69	60	10.6
Boys	2	26	36	11.4
Girls	6	43	24	8.9

$P < 0.05$  for mean onset age of psoriasis in boys vs. girls.

**Table 2.** The clinical features of boys and girls

Variables	Boys (%)	Girls (%)	Total (%)	<i>P</i>
Initial site on scalp	57.8	43.8	50.3	>0.05
Plaque psoriasis	48.4	56.2	52.6	>0.05
Guttate psoriasis	21.9	28.8	25.5	>0.05
Pustular psoriasis	9.4	12.3	10.9	>0.05
Erythrodermic psoriasis	3.1	6.8	5.1	>0.05
Nail change	21.8	28.8	25.5	>0.05
Koebnerization	23.4	17.8	20.4	>0.05
Pruritus	48.4	71.2	60.6	<0.05

side-effects of long-term systemic steroid treatment were noted in all cases. Severe flare occurred when the treatment was discontinued and weight gain was marked. Acne, fungus infection and psychological problem were noted in 5, 3, and 1 patients respectively.

Six patients with psoriasis pustulosa were given thiamphenicol when their condition was not controlled by corticosteroids. Thiamphenicol was proved effective and safe for children with psoriasis pustulosa and no obvious side-effects were observed.

Three patients had partial remission of the disease after administration of ciclosporin A, another choice for refractory psoriasis. Documented complications of ciclosporin A included abnormal liver function (1 patient), leukopenia (1), and herpes zoster (1).

## Discussion

Childhood psoriasis has long been recognized clinically, yet few epidemiologic studies are available.<sup>[1]</sup> As an outwardly visible disorder, psoriasis affects children's psychological and physical development and may strongly affect the quality of life.

The mean age for onset of the disease in this study was in agreement with that in two Asian studies,<sup>[2,3]</sup> but was older than that observed in some other geographic areas.<sup>[4,5]</sup> The male to female ratio of 1:1.14 was not significantly different from that reported in India and Australia.<sup>[2,5]</sup> The symptoms of the disease were exacerbated in 29 patients in winter, which is also the most influential season in previous reports, followed by spring.<sup>[2,4]</sup> Family history was identified in 11 patients (8%), but there were no correlations with the onset age, gender or severity, which is similar to the report from India,<sup>[2]</sup> but different from that of Australia.<sup>[5]</sup> In contrast to the earlier report by Nanda,<sup>[1]</sup> we observed

a higher incidence of upper respiratory infection in this age group (28.5%), which is in agreement with that reported by Nyfors and Seyhan.<sup>[6,7]</sup> The clinical features of childhood psoriasis in different countries are shown in Table 3.

The most frequent sites of psoriasis at onset are the scalp, extremities and trunk. It is difficult to establish a correct diagnosis when psoriasis appears in a child with a single atypical eruption. In our study, psoriasis was sometimes misdiagnosed as seborrheica and neurodermatitis when lesions only appeared on the scalp and elbow respectively. Genital region is also a common site for childhood psoriasis. It is sometimes misdiagnosed as balanitis. In the present study, nail changes were seen in 35 patients (25.6%) as reported by Bernhard.<sup>[8]</sup> There were no mucosal involvements in this cohort, but Nanda<sup>[1]</sup> reported a rate of 7%. Pruritus was the most common subjective symptom in childhood psoriasis, especially in girls because of their high sensitivity.

Psoriasis is a T helper-type 1 (Th1) cell mediated chronic inflammatory skin disease characterized by epidermal hyperproliferation and psoriatic plaques. Recently IL-17-producing CD<sub>4</sub><sup>+</sup> T lymphocytes (Th17) have been recognized as relevant factors for the pathogenesis of psoriasis.<sup>[9]</sup> Th1-related cytokines, such as TNF-alpha, IL-2 and IFN-gamma, and Th17-related cytokines, such as IL-17, IL-21, and IL-22 are abundant in psoriatic skin tissues.<sup>[9]</sup> Contact dermatitis, another inflammatory skin disease, is also related to the dysregulated Th17 immune response.<sup>[10]</sup> In our study, the incidence of contact dermatitis (22.6%) was higher than that observed in normal children,<sup>[11]</sup> which could be related to the common immunological mechanism.<sup>[10]</sup>

Plaque psoriasis was the most common type of childhood psoriasis in our study. In our patients, the involvement of the diaper region was fewer than that

**Table 3.** Clinical features of children with psoriasis in different countries<sup>[2,4,5]</sup>

Clinical findings	Our study	India 2004	Australia 2001	Kuwait 1994
Patients number	137	419	1256	190
Mean age (onset)	10.6	9.1	<5	5
Male/female ratio	1:1.14	1.09:1	1.14:1	1:1.5
Seasonal influence	Winter & Spring	Winter & Summer	Not mentioned	Winter & Summer
Precipitating infection	28.5%	2.4%	Not mentioned	12%
Family history	8%	4.5%	43%	28%
Nail involvement	25.6%	30.3%	0.6%	35.8%
Mucosal involvement	0	0	Not mentioned	7%
Psoriatic arthropathy	1.5%	1.1%	Not mentioned	1.6%
Most common initial site	Scalp	Legs	Scalp	Scalp
Plaque	72 (83.9%)	357 (85.2%)	484 (38.5%)	160 (84.2%)
Guttate	35 (25.6%)	41 (9.8%)	81 (6.4%)	21 (11.1%)
Pustulosa	15 (10.9%)	4 (1.0%)	68 (5.3%)	1 (0.5%)
Erythroderma	7 (5.1%)	3 (0.7%)	1 (0.1%)	2 (1.1%)
Others	8 (5.8%)	14 (3.3%)	622 (49.5%)	6 (3.2%)

observed in western countries,<sup>[5]</sup> but similar to that observed in India.<sup>[1]</sup> The Indian study addressed this phenomenon by the wide use of disposable nappy in western countries.<sup>[2]</sup> In China, disposable diapers is also very popular, but few cases of diaper psoriasis were diagnosed. Since infantile onset psoriasis (such as diaper psoriasis) is related to the familial incidence,<sup>[12]</sup> it is possible that the low incidence of diaper psoriasis in Asia is related to a low family prevalence.

In our patients, streptococcal infection is usually confirmed by throat swab culture or ASO test. Streptococcal antigens may play an important role in triggering psoriasis especially in guttate form.<sup>[13-15]</sup> Some studies proposed that streptococcal antigens may act not only as a triggering factor for self-limiting acute guttate psoriasis, but also as an on-going stimulus for the chronic form of the disease.<sup>[16,17]</sup> Antibiotics prescribed for these patients exert a therapeutic effect not only killing bacteria but also changing the capability of psoriasis-pathogenetic CD<sub>8</sub><sup>+</sup> T cells reacting to bacterial superantigens.<sup>[17,18]</sup>

The incidence of psoriasis pustulosa (10.9%) and psoriasis erythroderma (5.1%) surpassed that reported elsewhere.<sup>[2,4]</sup> This retrospective epidemiologic study focused on inpatients with relatively severe symptoms, excluding outpatients treated at clinics or primary medical centers. This may contribute to the higher incidence of severe psoriasis. Patients with severe psoriasis were treated with systemic corticosteroids in our clinics previously. When the symptoms of the disease are well controlled, systemic corticosteroids are usually contraindicated because of obvious side-effects after long-term use, including Cushing's syndrome, suppression of the hypothalamic-pituitary-adrenal axis, growth retardation, weight gain, and changes in mood and sleep patterns.<sup>[19]</sup> Five patients in our series were treated with thiamphenicol with obvious improvement of their conditions. It was an effective remedy for psoriasis pustulosa in our study. However, Juanqin et al<sup>[20]</sup> reported that thiamphenicol had little therapeutic effects, which are contrary to our findings. Further study should be performed to confirm the effectiveness of thiamphenicol on psoriasis pustulosa in children.

Cyclosporine, acitretin, methotrexate and biologics are antipsoriatic agents for severe psoriasis in children,<sup>[21]</sup> but clinical trials addressing the dosage and safety of these drugs are lacking in pediatric patients. Various studies suggested different views on the treatment of severe psoriasis in children.<sup>[21,22]</sup> There are a wide range of side-effects like premature epiphyseal closure and impaired bone growth on long-term acitretin,<sup>[23]</sup> renal dysfunction or hypertension caused by cyclosporine,<sup>[22]</sup> but experience is limited in application of these agents in pediatric patients. Clinical trials should be carried out to identify more effective

and relatively safer drugs for this group of patients.

Childhood psoriasis is a different entity from adult psoriasis.<sup>[24]</sup> Early diagnosis and appropriate management are particularly important in children to solve long-term disease-related psychosocial problems. To understand psoriasis in this age group, more investigations are demanded. It is also essential that doctors should take adequate care of or support their patients. Management also involves education of patients and their parents concerning the nature of the disease and the effects of treatment. Combined efforts can make a great difference in the outcome of psoriasis in pediatric patients.

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