

# *Study on the Rule of Traditional Chinese Medicine in Treating Psoriasis with Blood Heat Syndrome Based on Data Mining*

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**Abstract:** Objective is to analyze the composition of prescriptions for treating psoriasis with blood heat syndrome, and provide reference and basis for clinical treatment. Methods Based on the retrieval of the Chinese Journal Full Text Database (CNKI) and Wanfang data knowledge service platform, the prescriptions for the treatment of psoriasis vulgaris with blood heat syndrome were collected, and Excel and SPSS software were used for data mining analysis. Results, A total of 100 relevant literatures were included, including 100 effective Chinese medicine prescriptions. Among them, Rehmannia glutinosa, Peony bark, Paeonia rubra, Lithospermum, etc. are high-frequency Chinese medicines for the treatment of blood heat syndrome of psoriasis vulgaris. The drugs used more than 9 times have the effects of clearing heat, cooling blood, detoxifying, and drying dampness. The drug combinations used more frequently are Peony bark - Rehmannia glutinosa, Paeonia rubra - Rehmannia glutinosa. Conclusion Traditional Chinese medicine can not only clear away heat and cool blood, but also eliminate toxins and dampness, which provides some consideration and basis for the clinical treatment of psoriasis.

Psoriasis, also known as "Baibi" In traditional Chinese medicine, is an inflammatory, recurrent, and chronic disease mediated by immunity, which is related to genetic and environmental factors, and usually accompanies for life. At present, it is mainly divided into blood heat syndrome, blood stasis syndrome, and blood dryness syndrome. Blood heat syndrome is the most common clinical syndrome, which is mainly manifested by the skin rash in the form of drops, bright red color, severe itching, dry mouth and dry tongue, red tongue, yellow fur, and pulse number. At present, the literature on the treatment of this disease by traditional Chinese medicine is mainly clinical research and famous experts' experience, lacking in-depth analysis. This research uses Excel and SPSS software to analyze and study relevant literature, providing a certain references for clinical and scientific research.

## 1. Materials and Methods

### 1.1. Literature Source

The Chinese Journal Full Text Database (CNKI) and Wanfang Data Knowledge Service Platform were selected as the data source to retrieve the literature on the treatment of psoriasis and blood heat syndrome by oral administration of traditional Chinese medicine in the past 30 years from the establishment of the database to December 2021. "Psoriasis" and "Baibi" were used as the subject words, and "blood heat" and "traditional Chinese medicine" were used as free words.

### 1.2. Inclusion Criteria

1) Clinical diagnosis of psoriasis and TCM syndrome meet the criteria of blood heat syndrome; 2) The main treatment is oral administration of traditional Chinese medicine decoction, with clear drug taste and dosage records; 3) Including standardized and complete efficacy evaluation indicators.

### 1.3. Exclusion Criteria

1) Unusual psoriasis, blood heat syndrome, such as ordinary blood stasis syndrome, erythrodermic psoriasis, etc; 2) Other diseases are mainly mixed with psoriasis; 3) Take Chinese medicine orally as an auxiliary therapy; 4) Review, guidelines and other non clinical research literature; 5) Repeat the prescription only once; 6) Mongolian medicine, Tibetan medicine and other minority medical literature.

### 1.4. For Data Standardization

Refer to the Pharmacopoeia of the People's Republic of China (2020) and the 9th edition of the National Planning Textbook for Colleges and Universities of Traditional Chinese Medicine (Chinese Medicine), and standardize the names of the entered traditional Chinese medicines. For example, regulate Zaoxiu as Paridis, Yuanshen as Scrophulariae, double flowers as Honeysuckle, and Quanchong as Scorpion.

## 2. Results

### 2.1. Through Strict Inclusion Criteria and Exclusion Criteria

100 qualified documents were finally entered, including 100 prescriptions, involving 144 Chinese herbs, with a cumulative use frequency of 1168. Among them, 32 traditional Chinese medicines with a frequency of  $\geq 9$  were used, with a cumulative frequency of 897, accounting for 76.80% of the total frequency. The top 32 in terms of frequency of use are *Rehmannia glutinosa*, Peony bark, *Paeonia rubra*, *Lithospermum*, *Smilax glabra*, etc. See Table 1.

Table 1: High frequency drugs ( $\geq 9$  times) for psoriasis blood heat syndrome in 100 prescriptions.

No	Medicine	Frequency	No	Medicine	Frequency
1	Rehmannia glutinosa	82	17	Folium isatidis	25
2	Peony bark	60	18	Caulis spatholobi	24
3	Paeonia rubra	57	19	Figwort	22
4	Lithospermum	55	20	Forsythia suspensa	21
5	Smilax glabra	48	21	Saposhnikovia divaricata	18
6	Licorice	47	22	Cicada slough	17
7	Salvia miltiorrhiza	39	23	Paridis	13
8	Cortex dictamni	39	24	Sophora flavescens	13
9	Hedyotis diffusa	36	25	Herba schizonepetae	12
10	Honeysuckle	34	26	Radix sophorae tonkinensis	11
11	Radix isatidis	30	27	Rubia cordifolia	11
12	Buffalo horn	30	28	Safflower	9
13	Sophora japonica	30	29	Gardenia	9
14	Chinses angelica	26	30	Dandelion	9
15	Scutellaria baicalensis	26	31	Scorpion	9
16	Imperatae rhizome	26	32	Gypsum	9

## 2.2. Classification of High-Frequency Drug Efficacy

According to the efficacy of high-frequency drugs, they are mainly divided into six categories, namely, heat clearing drugs, blood activating and stasis removing drugs, haemostatic drugs, surface relieving drugs, deficiency tonifying drugs and liver calming drugs, as shown in Table 2.

Table 2: Classification of high frequency drug efficacy in 100 prescriptions for psoriasis with blood heat syndrome

Effect	Quantity	Medicine
Antipyretic		
Heat clearing and blood cooling medicine	6	Rehmannia glutinosa, peony bark, paeonia rubra, lithospermum, buffalo horn, sophora flavescens
Antipyretic and antidote	9	Smilax glabra, hedyotis diffusa, honeysuckle, radix isatidis, folium isatidis, paridis, dandelion, radix sophorae tonkinensis, forsythia suspensa
Heat clearing and dampness drying medicine	3	Cortex dictamni, scutellaria baicalensis, sophora flavescens
Antipyretic powder	2	Gardenia, gypsum
Blood activating and stasis removing drugs	3	Salvia miltiorrhiza, safflower, caulis spatholobi
Hemostatics	3	Sophora japonica, imperatae rhizome, rubia cordifolia
Antiepidote	3	Herba schizonepetae, saposhnikovia divaricata, cicada slough
Tonifying medicine	2	Licorice, chinses angelica
Liver calming and wind calming drugs	1	Scorpion

## 2.3. Association Rules and Network Display

Use SPSSModeler18 software to calculate association rules and core drug network, respectively. See Table 3, Table 4, and Table 5 for association rules and Table 1 for the core drug network.

Table 3: Top 10 common drugs for psoriasis blood heat syndrome in 100 prescriptions.

No	The former	The latter	Support /%	Confidence /%
1	Peony bark	Rehmannia glutinosa	60.0	90.0
2	Paeonia rubra	Peony bark	57.0	71.9
3	Paeonia rubra	Rehmannia glutinosa	57.0	91.2
4	Lithospermum	Rehmannia glutinosa	55.0	83.6
5	Smilax glabra	Rehmannia glutinosa	48.0	87.5
6	Licorice	Rehmannia glutinosa	47.0	80.9
7	Licorice	Peony bark	47.0	72.3
8	Salvia miltiorrhiza	Rehmannia glutinosa	39.0	84.6
9	Salvia miltiorrhiza	Paeonia rubra	39.0	76.9
10	Salvia miltiorrhiza	Smilax glabra	39.0	71.8

Table 4: Top 10 compatibilities of 3 commonly used drugs for psoriasis blood heat syndrome in 100 prescriptions.

No	The former	The latter	Support /%	Confidence /%
1	Lithospermum, rehmannia glutinosa	Paeonia rubra	46.0	71.7
2	Smilax glabra, rehmannia glutinosa	Paeonia rubra	42.0	71.4
3	Paeonia rubra, peony bark	Rehmannia glutinosa	41.0	87.8
4	Licorice, rehmannia glutinosa	Peony bark	38.0	78.9
5	Lithospermum, peony bark	Rehmannia glutinosa	35.0	94.2
6	Licorice, peony bark	Rehmannia glutinosa	34.0	88.2
7	Salvia miltiorrhiza, rehmannia glutinosa	Paeonia rubra	33.0	81.8
8	Salvia miltiorrhiza, rehmannia glutinosa	Peony bark	33.0	75.8
9	Salvia miltiorrhiza, rehmannia glutinosa	Smilax glabra	33.0	72.7
10	Smilax glabra, peony bark	Rehmannia glutinosa	31.0	96.8

Table 5: Top 10 compatibilities of 6 commonly used drugs for psoriasis blood heat syndrome in 100 prescriptions.

No	Frequent items	Support /%	Confidence /%
1	Salvia miltiorrhiza, smilax glabra, paeonia rubra, peony bark, rehmannia glutinosa, lithospermum	12.0	75.0
2	Imperatae rhizome, salvia miltiorrhiza, smilax glabra, paeonia rubra, rehmannia glutinosa, caulis spatholobi	11.0	72.7
3	Smilax glabra, lithospermum, paeonia rubra, imperatae rhizome, salvia miltiorrhiza	11.0	81.8
4	Caulis spatholobi, salvia miltiorrhiza, smilax glabra, lithospermum, paeonia rubra, rehmannia glutinosa	11.0	90.9
5	Sophora japonica, smilax glabra, lithospermum purpurea, paeonia rubra, rehmannia glutinosa, salvia miltiorrhiza	11.0	72.7
6	Salvia miltiorrhiza, cortex dictamni, lithospermum, paeonia rubra, peony bark, rehmannia glutinosa	11.0	81.8
7	Caulis spatholobi, smilax glabra, lithospermum, paeonia rubra, rehmannia glutinosa, salvia miltiorrhiza	10.0	100
8	Caulis spatholobi, salvia miltiorrhiza, isatis indigotica, paeonia rubra, rehmannia glutinosa, lithospermum	10.0	90.0
9	Salvia miltiorrhiza, cortex dictamni, lithospermum, peony bark, rehmannia glutinosa, paeonia rubra	10.0	90.0
10	Salvia miltiorrhiza, smilax glabra, lithospermum, paeonia rubra, peony bark, rehmannia glutinosa	10.0	90.0
	Salvia miltiorrhiza, cortex dictamni, lithospermum, peony bark, rehmannia glutinosa, paeonia rubra	10.0	90.0

## 2.4. Cluster Analysis

According to the grouping distance of 20, five groups of commonly used traditional Chinese medicines for the treatment of psoriasis with blood heat syndrome were obtained, including the first group: Peony bark, Honeysuckle, Forsythia suspensa, licorice, and Scutellaria baicalensis; Group 2: Cicada decidua, Saposhnikovia divaricata, Folium Isatidis, Cortex dictamni; Group 3: Chinese angelica, Figwort; Group 4: Hedyotis diffusa and Buffalo horn; Group 5: Caulis spatholobi, Imperatae rhizome, Radix isatidis, Sophora japonica, Lithospermum, Salvia miltiorrhiza, Smilax glabra, Rehmannia glutinosa, Paeonia rubra, see Figure 1.

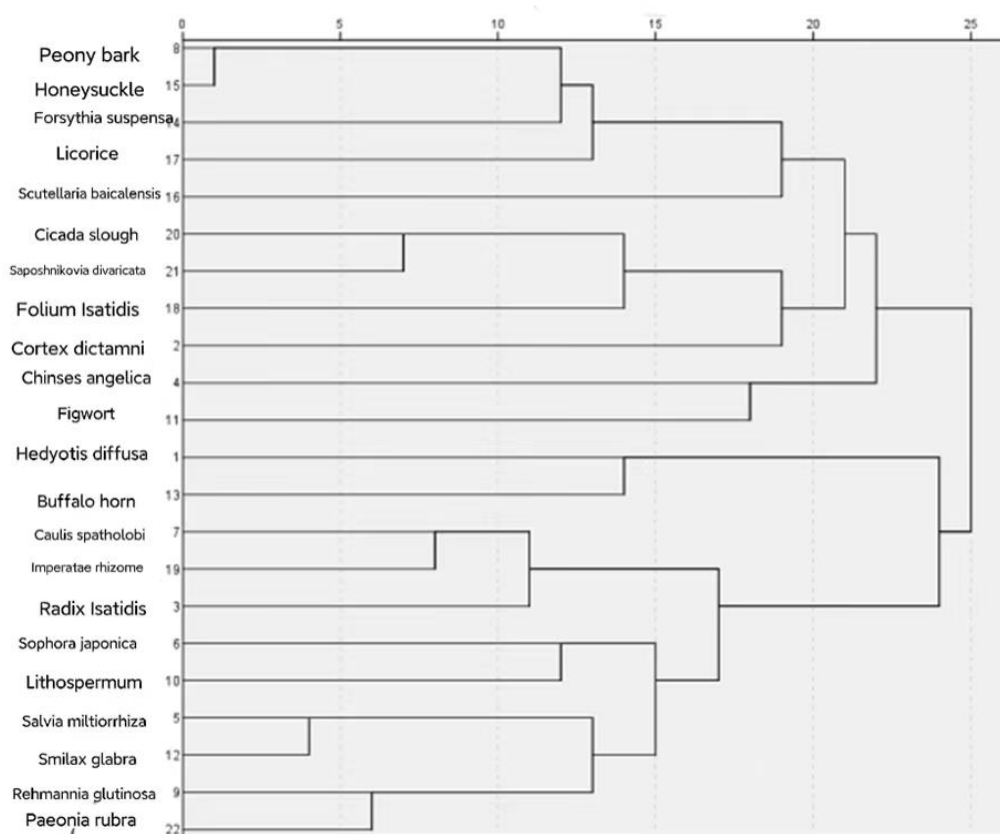


Figure 1: Cluster analysis of high frequency drugs in 100 prescriptions for psoriasis with blood heat syndrome.

## 3. Discuss

Psoriasis, also known as "Bai bi", "Gan xuan", "white shell sore", etc. in traditional Chinese medicine, it is mainly caused by the accumulation of heat in the body, the re feeling of wind heat evil, the stagnation of heat, and the generation of wind by blood heat. The pathogenesis of this disease is mostly focused on the word "blood heat" by contemporary doctors. Professor Zhao Bingnan believes that blood fever is the main internal cause of the disease[1]. In addition to the exogenous wind evil or dry heat evil, both internal and external causes of the disease occur simultaneously. Professor Zhu Renkang believes that the disease is caused by internal stress and external stress[1]. Professor Jin Qifeng believes that the disease is caused by the intrinsic heat toxin, which is caused by the re feeling of pathogenic rheumatism[1]. Therefore, more attention should be paid to the elimination of the toxic pathogen in the treatment of blood heat syndrome. Professor Li Bin believes that the disease is mainly caused by heat, its location is in the blood, and the basic

pathogenesis is blood heat yang floating[1]. Professor Liu Fuxing believes that the internal attack of heat toxin from apoplexy is the standard of the disease, and the accumulation of toxin from blood heat of the vegetarian body is the basis, and the treatment should be based on the same root cause[1].

By analyzing the drug frequency in the literature, the high-frequency drugs for the treatment of psoriasis blood heat syndrome are rehmannia root, Peony bark, Paeonia rubra, Lithospermum, and Smilax glabra. High frequency drugs are mainly used in 6 categories, such as heat clearing drugs, blood activating and stasis removing drugs, hemostatic drugs, and surface relieving drugs. Among them, the frequency of occurrence of the heat clearing and blood cooling drug Rehmannia glutinosa is as high as 82 times. It can be seen that heat clearing and blood cooling drugs rank first in the treatment of this disease. The function of Rehmannia glutinosa is to clear heat, cool blood, and nourish yin and promote fluid. Modern pharmacological research shows that Rehmannia glutinosa contains retinoic acid, a variety of sugars, and amino acids, which can stop bleeding and promote the function of hematopoietic cells, reduce the permeability of capillaries, and inhibit vascular endothelial inflammation[1]. The frequency of use of Paeonia rubra is second only to that of raw rehmannia root, which can clear heat, cool blood, dissipate blood stasis, and relieve pain. Modern pharmacological studies have shown that Paeonia rubra has anti-inflammatory, antioxidant, and immune regulating effects [7]. Its mechanism of action in treating psoriasis may be related to the reduction of VEGF and bFGF production in fibroblasts by the main component paeoniflorin. Lithospermum has the functions of cooling blood, activating blood, detoxifying, and penetrating rash. Its root is used as medicine and has anti-inflammatory, antiviral, immune regulating, and bactericidal effects. The effective component shikonin may achieve its anti-angiogenesis effect by inhibiting the expression of angiogenic factors [8]. Other studies have shown that shikonin may have the function of inhibiting the expression of VEGF, IL-6, and IL-23 in keratinocytes of psoriasis and affecting the formation and activation of Th17 cells. Peony bark has the functions of clearing heat, cooling blood, promoting blood circulation, and removing blood stasis. Studies have shown that the main component paeonol has a good anti-inflammatory effect [9]. The functions of Smilax glabra are detoxification, dehumidification, and joint facilitation. Modern pharmacological studies show that Smilax glabra can inhibit cellular immune response and selectively inhibit activated T cells[10]. Clinical experience shows that this herb has a better effect on psoriasis caused by dampness. According to the statistics of the efficacy of traditional Chinese medicine, the frequency of drug use is the highest, among which the frequency of drug use is heat clearing and blood cooling, which is consistent with the heat treatment of blood in this syndrome, followed by heat clearing and detoxification drugs, which also coincides with the pathogenesis of psoriasis, where blood heat is toxic to the skin. At the same time, the damp pathogen is also closely related to the occurrence and development of the disease. The wind heat mixed with dry heat can cause obstacles to the skin in water delivery, so the use of dry and damp drugs also confirms this point.

By analyzing the results of association rule analysis, it was found that the commonly used drug pairs for the treatment of psoriasis blood heat syndrome were Peony bark Rehmannia glutinosa, Paeonia rubra Peony bark, Paeonia rubra-Rehmannia glutinosa, etc. Among them, Peony bark-Rehmannia glutinosa has the highest support. High frequency drugs can enhance the curative effect by directly promoting the compatibility of the two drugs and play the role of clearing heat, cooling blood, detoxifying, and removing plaques. The results of the combination of three drugs showed that the frequency of occurrence of the drug group was the highest, and the three drugs were all heat clearing and blood cooling drugs, suggesting that the pathogenesis of this disease was mainly related to the blood heat accumulation, which was consistent with the current treatment of this syndrome. According to the observation of the compatibility of 6 commonly used drugs, the most supportive one is Xijiao Dihuang Decoction, which removes the rhinoceros horn, adds Smilax

glabra and Lithospermum, and the rest is mostly Xijiao Dihuang Tang. Modern research shows that Xijiao Dihuang Decoction can inhibit VEGF, Ang1, and TGF- $\beta$ , and the expression of genes related to angiogenesis will eventually inhibit angiogenesis [11].

The results of cluster analysis showed that the first group was the addition and subtraction of Qingwen Baidu Drink, which could clear away the heat and purge, the fire, cool blood, and detoxify. It was suitable for those with burning fire and burning blood; the second group is the addition and subtraction of Xiaofeng Powder, which can drain wind and nourish blood, clear away heat and dehumidify, and is suitable for the winner of damp evil; the third group is the addition and subtraction of Simiao Yong'an Decoction, which is used to clear heat and detoxify, strengthen the body and nourish yin. It is suitable for those with psoriasis in the late stage who have not lost their toxin and have lost their vital energy; the fourth group was the addition and subtraction of Liangxue Huaban Decoction, which was used to cool blood and remove spots, clear heat and detoxify, and was suitable for those with hypertrophic skin lesions and dark color; The fifth group is Xijiao Dihuang Decoction plus or minus several kinds of blood stasis drugs to clear heat and cool blood while removing blood stasis and dredging meridians.

To sum up, from the perspective of drug frequency and correlation analysis, it is suggested that the clinical treatment of blood heat syndrome of psoriasis vulgaris should use the methods of clearing heat, cooling blood, clearing heat and detoxification, and pay attention to the elimination of the evil of dryness and heat. In this study, data mining technology was used to analyze 100 literatures, analyze and study the traditional Chinese medicine prescriptions for psoriasis, and summarize the potential laws of high-frequency drugs, drug use rules, etc. However, due to the quality of literature, the limitations of data mining technology itself, and other factors, the conclusions drawn need to be further verified and improved in clinical practice, which will provide some reference for the research and development of new drugs in the treatment of psoriasis with traditional Chinese medicine.

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