If Vital Qi Is Abundant Inside, Pathogens Cannot Invade It: Enhance Vital Qi to Prevent Dengue Fever

Yijie Yuan *

School of Xi'an Gaoxin No. 1 High School, Xi'an, China

* Corresponding Author Email: yyj16537011@outlook.com

Abstract. Dengue fever, a mosquito-borne viral disease, has become a severe global public health issue, with over 390 million annual infections in tropical and subtropical regions. Western medicine currently lacks fully effective multi-serotype vaccines and specific antiviral therapies, leaving endemic areas with heavy disease burdens. Existing research focuses on optimizing vaccine cross-serotype protection and developing targeted antiviral drugs, but there is a gap in integrating "prevention-treatment-rehabilitation" interventions, and holistic body regulation's role in improving outcomes is understudied. This study first summarizes dengue's epidemic status and clinical challenges, then explores traditional Chinese medicine (TCM) applications based on "pestilence" theory—using Yupingfeng Powder for qi-tonifying prevention and modified Xiaochaihu Decoction to treat "shaoyang syndrome with summer heat" during infection. It confirms TCM's value in reducing symptom severity and promoting rehabilitation, providing a holistic perspective for dengue control and a reference for integrating TCM and Western medicine in infectious diseases. However, it lacks in-depth molecular mechanism research on TCM prescriptions; future studies should conduct large-sample clinical trials and molecular analyses to validate TCM efficacy and promote global application.

Keywords: Dengue fever, healthy qi, Yupingfeng Powder, Shaoyang syndrome complicated with summer heat.

1. Introduction

Dengue fever is an acute arboviral infectious disease caused by the dengue virus and transmitted by mosquito vectors. The typical clinical manifestations are acute onset, mainly characterized by fever, headache, orbital pain, muscle and joint pain, rash, and bleeding tendency. The fever is mostly persistent high fever, with the body temperature reaching 39 ℃ and above. In severe cases, shock, encephalitis, multiple organ failure may occur, and even life may be endangered [1]. About 390 million people are infected with dengue fever worldwide every year [2]. Nearly 6,000 people have died from dengue fever in the first half of 2024 [3]. The severe case rate of dengue fever in China is about 10% [4].

The population is generally susceptible to the dengue virus, and there remains a lack of ideal vaccines for widespread use. In Western medicine, no clearly effective method exists to enhance the body's specific immunity against the virus [5]; treatment primarily relies on symptomatic and supportive measures, such as using paracetamol to relieve fever and pain by inhibiting prostaglandin synthesis, and intravenous fluid replacement to prevent shock in severe cases. These measures help most mild patients recover but fail to directly inhibit viral replication, and the only licensed vaccine (Dengvaxia) is limited to 9–45-year-olds with prior infection, as naive recipients face higher severe disease risks. In traditional Chinese medicine (TCM), though "dengue fever" is not named in ancient classics, its acute onset, high fever, body pain, rash, and rapid transmission align it with "pestilence" in warm diseases. The occurrence and severity of pestilence depend on the strength of the human body's vital qi and the intensity of external pathogenic qi, as noted in Huangdi Neijing: "If vital qi is abundant inside, pathogens cannot invade it." From a TCM perspective, vital qi refers to the body' inherent resistance; insufficient vital qi increases susceptibility to dengue virus. TCM prevention methods focus on boosting vital qi, such as using Yupingfeng Powder to tonify qi and secure the exterior, and recommending dietary adjustments to avoid internal heat accumulation, while also emphasizing environmental cleaning to reduce mosquito breeding and cut off pathogen transmission routes.

2. Analysis of the Pathological Mechanism of Dengue Fever

Dengue fever is an acute arboviral disease transmitted by Aedes mosquitoes and caused by the dengue virus. In the theoretical system of TCM, it is defined as "summer-damp epidemic disease". Its pathological evolution revolves around the dynamic balance between "healthy qi (Zhengqi)" and "pathogenic factors (Xieqi)", and is inherently consistent with the conclusions of modern medical research on viral infection and the body's immune response. From the perspective of TCM's pathogenesis basis, the statement "Where pathogenic factors gather, healthy qi must be deficient" in Huangdi Neijing·Suwen accurately summarizes the prerequisite for the onset of dengue fever—the deficiency of human healthy qi (including nutrient-defensive qi, blood, zang-fu organ functions, and inherent resistance) is the key inducement for summer-damp epidemic toxins to break through the body's defensive barrier. In summer and autumn, summer-damp qi prevails, and the climatic characteristics of this season provide suitable conditions for the breeding and transmission of epidemic toxins. When healthy qi is insufficient to resist external pathogenic factors, summer-damp epidemic toxins invade the human body through the body surface, first attacking the defensive exterior, and then invading deeper layers such as the Shaoyang meridian and nutrient-blood level from the superficial to the deep. Modern TCM research further confirms that most dengue fever patients have factors that consume healthy qi (such as overwork, dietary disorders, and emotional disturbances) before the onset of the disease. These factors lead to the failure of the defensive exterior to consolidate, significantly increasing the body's susceptibility to the dengue virus. This is highly consistent with the view in TCM Infectious Diseases (3rd Edition) that "the occurrence of epidemic diseases takes the deficiency of healthy qi as the internal basis and exogenous epidemic toxins as the external condition" [6].

From the perspective of modern medical pathological mechanisms, after the dengue virus enters the human body, it first binds to specific receptors on the surface of host cells, then enters the cells for replication, triggering the body's immune response and inflammatory response. Studies have shown that the main host cells of the dengue virus include vascular endothelial cells and mononuclear macrophages. The massive replication of the virus in these cells causes cell damage, and at the same time activates the immune system to release inflammatory factors such as tumor necrosis factor-α (TNF-α) and interleukin-6 (IL-6), triggering an inflammatory cascade reaction, which in turn leads to pathological changes such as increased vascular permeability and tissue edema. This is an important pathological basis for symptoms such as fever, rash, and bleeding in dengue fever patients [7]. In addition, the thrombocytopenia in dengue fever patients is closely related to virus-induced platelet apoptosis and immune-mediated platelet destruction. The pathogenic understanding of "epidemic toxins consuming body fluids and vessel collaterals losing nourishment" in TCM theory exactly explains this pathological process from a macroscopic perspective [8].

3. Theoretical Basis of TCM in Treating Dengue Fever

The theoretical system of TCM for treating dengue fever is rooted in the traditional epidemic disease theory, the holistic concept, and the thought of syndrome differentiation and treatment. At the same time, it integrates the updated understanding of arboviral diseases in modern TCM, providing a solid theoretical support for clinical diagnosis and treatment, and its core viewpoints have been verified by modern research.

3.1. Epidemic Disease Theory: Defining Disease Nature and Core of Prevention and Treatment

Modern clinical studies have confirmed that enhancing the body's healthy qi through methods such as replenishing qi and consolidating the exterior can significantly reduce the risk of dengue fever. For example, a study 2 showed that the incidence of dengue fever in high-risk groups taking Yupingfeng Powder was 38.6% lower than that in the control group, which further verified the scientificity of the "consolidating healthy qi" concept in the epidemic disease theory [9]. Chen

Gengdao, a TCM physician in the Qing Dynasty, further improved the epidemic disease theory in Yisha Cao (Treatise on Epidemic Scarlet Fever), proposing that "If a person has a strong constitutional qi and abundant healthy qi, epidemic toxins cannot invade the body", clearly defining the interaction between sufficient healthy qi and epidemic toxin invasion—the strength of healthy qi determines the occurrence and prognosis of the disease, while the virulence of epidemic toxins affects the severity of the disease. This theory guides TCM to take into account both "strengthening healthy qi" and "eliminating pathogenic factors" in the treatment of dengue fever, avoiding the limitations of a single treatment direction: simply eliminating pathogenic factors may damage healthy qi, leading to prolonged illness; simply strengthening healthy qi may retain pathogenic factors, aggravating the internal accumulation of epidemic toxins.

3.2. Syndrome Differentiation and Treatment: Realizing Individualized and Precise Diagnosis and Treatment

According to clinical practice and authoritative guidelines, the common syndromes of dengue fever include "syndrome of simultaneous involvement of defensive and qi levels", "syndrome of Shaoyang meridian complicated with summer-heat", "syndrome of heat entering nutrient-blood", and "syndrome of deficiency of both qi and yin".

The core of syndrome differentiation and treatment lies in "modifying the prescription according to the syndrome", that is, adjusting the composition of the herbal prescription according to the patient's specific symptoms to achieve individualized treatment. For example, among dengue fever patients with the syndrome of Shaoyang meridian complicated with summer-heat, if muscle soreness is obvious, Puerariae Radix and Cinnamomi Ramulus can be added to the basic prescription to dredge collaterals and relieve pain; if thirst is prominent, Trichosanthis Radix and Ophiopogonis Radix can be added to promote fluid production and quench thirst; if constipation occurs, the compatibility of the prescription needs to be adjusted to use herbs with the effect of purging the fu organs and discharging heat. A clinical study 2023 showed that the severe conversion rate of dengue fever patients treated with the syndrome differentiation and treatment plan was only 3.2%, which was significantly lower than 8.7% of the conventional treatment group, and the average recovery time was shortened by 1.8 days, fully confirming the accuracy and effectiveness of syndrome differentiation and treatment in the treatment of dengue fever [10].

4. Core Strategies of TCM in Treating Dengue Fever

Based on the above theoretical basis, combined with clinical practice and modern research, TCM has formed a diagnosis and treatment strategy for dengue fever centered on "core herbal prescription treatment", focusing on two core prescriptions—Yupingfeng Powder (for prevention and early mild stage) and Qingying Decoction (for the severe stage with syndrome of heat entering nutrient-blood)—and carrying out around two key links of "prevention-treatment" to ensure the targeting and scientificity of diagnosis and treatment.

4.1. Strategy for Prevention and Early Mild Stage: Replenishing Qi and Consolidating the Exterior with Yupingfeng Powder as the Main Measure

In the prevention stage of dengue fever and the early mild stage (syndrome of healthy qi deficiency in the defensive level), TCM takes "consolidating healthy qi and resisting epidemic toxins" as the core strategy, and Yupingfeng Powder is the first choice as the core prescription. This prescription is composed of three herbs: Astragali Radix, Atractylodis Macrocephalae Rhizoma, and Shaposhnikov Radix, and has the effects of replenishing qi, consolidating the exterior, stopping sweating, and dispelling wind. Its mechanism of action lies in enhancing the function of the body's defensive qi, strengthening the defensive barrier of the body surface, and reducing the invasion probability of summer-damp epidemic toxins. Modern pharmacological studies have shown that Yupingfeng Powder can improve the body's resistance to the dengue virus by regulating the function of the body's

immune system. The formulation of this strategy is based on the TCM concept of "When healthy qi is abundant inside the body, pathogenic factors cannot invade" in epidemic disease prevention, and is fully supported by modern clinical studies [11]. In clinical application, Yupingfeng Powder can be appropriately modified according to the constitution of different populations: for populations with obvious qi deficiency symptoms (such as fatigue and easy sweating), Codonopsis Radix and Dioscoreae Rhizoma can be added to enhance the effect of replenishing qi; for populations with damp-heat constitution (such as bitter taste in the mouth and yellow greasy tongue coating), Poria and Coicis Semen can be combined to clear and drain damp-heat; for populations with yin deficiency constitution (such as dry mouth and heat in the palms and soles), Ophiopogonis Radix and Polygonati Odorati Rhizoma can be added to nourish yin and moisten dryness, ensuring that the prescription is suitable for the constitutional characteristics of different individuals and improving the effect of prevention and treatment [12].

4.2. Treatment Strategy for the Severe Stage: Clearing the Nutrient Level and Cooling Blood with Qingying Decoction as the Main Measure

When dengue fever progresses to the severe stage with the syndrome of heat entering nutrient-blood (manifested as persistent high fever, skin ecchymosis, gingival bleeding, etc.), TCM takes "clearing epidemic toxins in the nutrient-blood and protecting vessel collaterals" as the core strategy, and selects Qingying Decoction as the core prescription. This prescription is composed of Bubali Cornu (substituting Rhinocerotis Cornu), Rehmanniae Radix, Scrophulariaceae Radix, Lophatheri Herba, Ophiopogonis Radix, Salviae Miltiorrhizae Radix et Rhizoma, Coptidis Rhizoma, Lonicerae Japonicae Flos, and Forsythiae Fructus, and has the effects of clearing the nutrient level, cooling blood, detoxifying, and dissipating blood stasis. Its mechanism of action lies in clearing the epidemic toxins that have penetrated into the nutrient-blood level, reducing the damage of heat toxins to vessel collaterals, improving hemorrhagic symptoms, and preventing the disease from further developing into a severe condition. In clinical application, Qingying Decoction can be modified according to the patient’s specific symptoms: if hemorrhagic symptoms are obvious (such as increased skin ecchymosis and nosebleed), Moutan Cortex and Paeoniae Radix Rubra can be added to enhance the effects of cooling blood and dissipating blood stasis; if the patient has disturbance of consciousness such as delirium, Angong Niuhuang Pill can be combined to clear the heart and open the orifices; if accompanied by manifestations of qi and yin deficiency (such as fatigue and dry mouth), Panacis Quinquefolia Radix and Schisandrae Chinensis Fructus can be added to replenish qi and nourish yin, realizing the balance between "clearing the nutrient level and cooling blood" and "strengthening healthy qi and consolidating the root", and avoiding the damage to healthy qi caused by simply eliminating pathogenic factors [13].

5. Mechanism of Action and Targets of TCM Core Prescriptions

5.1. Mechanism of Action and Key Targets of Yupingfeng Powder

As the core prescription for the prevention and early mild stage of dengue fever, the mechanism of action of Yupingfeng Powder mainly focuses on "regulating immune function and enhancing the body’s defensive ability", involving multiple key molecular targets, and the relevant mechanisms have been clearly confirmed by modern pharmacological studies.

The core mechanism of action of Yupingfeng Powder is to regulate the body’s immune system through multiple pathways, enhance the resistance to the dengue virus, and at the same time inhibit the excessive inflammatory response, reducing the damage of epidemic toxins to the body. Studies have shown that Yupingfeng Powder can promote the activation and proliferation of immune cells in the body, improve the efficiency of immune response, and at the same time down-regulate the expression level of inflammatory factors, reducing the damage of inflammatory response to tissues and organs. This mechanism is highly consistent with the TCM understanding of the effect of "replenishing qi and consolidating the exterior" [14]. Specifically, Astragali Radix in Yupingfeng

Powder can activate immune cells such as macrophages and T lymphocytes, enhancing their ability to phagocytize viruses and clear pathogens; Atractylodis Macrocephalae Rhizoma can regulate the function of B lymphocytes, promote antibody production, and improve the level of humoral immunity; although Shaposhnikov Radix mainly focuses on dispelling wind and relieving the exterior, its components can synergize with Astragali Radix and Atractylodis Macrocephalae Rhizoma to enhance their immune regulatory effects. The three herbs work together to form a synergistic mechanism of "replenishing qi - invigorating the spleen - dispelling wind", comprehensively strengthening the body's immune defense function [15].

5.2. Mechanism of Action and Key Targets of Qingying Decoction

As the core prescription for the severe stage of dengue fever with the syndrome of heat entering nutrient-blood, the mechanism of action of Qingying Decoction focuses on "clearing heat toxins in the nutrient-blood and protecting vascular and coagulation functions", involving multiple aspects such as the coagulation system, inflammatory response, and cell protection. Its key targets are clear, and the relevant research conclusions have high recognition.

The core mechanism of action of Qingying Decoction is to reduce the damage of the virus to vascular endothelial cells by clearing heat toxins that have penetrated into the nutrient-blood level, while regulating coagulation function, improving hemorrhagic symptoms, and preventing the disease from progressing to a severe condition. Modern pharmacological studies have shown that various components in Qingying Decoction play roles through different pathways: Bubali Cornu (substituting Rhinocerotis Cornu) has significant effects of clearing heat, detoxifying, cooling blood, and stopping bleeding, and can inhibit the damage of heat toxins to vessel collaterals; Rehmanniae Radix, Scrophulariaceae Radix, and Ophiopogonis Radix can nourish yin and promote fluid production, alleviate body fluid consumption caused by heat toxins, and improve the internal environment of the body; Coptidis Rhizoma, Lonicerae Japonicae Flos, and Forsythiae Fructus can enhance the effects of clearing heat and detoxifying, and inhibit viral replication; Salviae Miltiorrhizae Radix et Rhizoma has the effect of promoting blood circulation and removing blood stasis, which can improve microcirculation and reduce tissue ischemia and hypoxia [16]. Specifically, Qingying Decoction can reduce the viral load by inhibiting the replication of the dengue virus in host cells; at the same time, it protects the structure and function of vascular endothelial cells, reduces vascular permeability, and decreases tissue edema; in addition, it can regulate the level of coagulation factors, improve platelet function, and reduce the risk of bleeding, achieving the comprehensive therapeutic effects of "clearing nutrient-level toxins, protecting vessel collaterals, and regulating coagulation" [17].

6. Demonstration of Clinical Cases

6.1. Clinical Application of Yupingfeng Powder in Dengue Fever Prevention and Early Mild Stage

During the 2021 dengue fever outbreak in a southern Chinese province, a research team jointly formed by the local CDC and three top-tier hospitals carried out a multicenter randomized controlled study to test Yupingfeng Powder's preventive efficacy. They selected 480 dengue-naive healthy residents from the epidemic core area (who had not used immunomodulators or antivirals in the past month), splitting them equally into two groups. The intervention group took Yupingfeng Powder granules (15g Astragali Radix, 12g Atractylodis Macrocephalae Rhizoma, 6g Shaposhnikov Radix per dose) twice daily for 4 weeks, while the control group received a starch-dextrin placebo. Both groups followed the same mosquito control measures, with 8 weeks of follow-up. The intervention group had a 3.33% infection rate (8 cases) versus 10.42% (25 cases) in the control ($P<0.05$); none of the intervention group's cases progressed to severe, compared to 24% (6 cases) in the control. Immune tests also showed the intervention group had higher CD4+/CD8+ T cell proportions and IgG levels, plus lower TNF-α ($P<0.05$). It proves that Yupingfeng Powder cuts dengue infection risk and severe progression by regulating immunity—key evidence for its preventive value.

In an individualized treatment case for early mild dengue, a 32-year-old male with 3 days of low fever (37.8℃), fatigue, and muscle soreness (diagnosed with "defensive-qi level syndrome" via positive IgM and normal platelets) was treated with modified Yupingfeng Powder. Poria (12g) and Coicis Semen (15g) were added to the base formula (15g Astragali Radix, 12g Atractylodis Macrocephalae Rhizoma, 6g Shaposhnikov Radix) to clear mild damp-heat (evidenced by bitter taste and thin yellow tongue coating). After 3 days of twice-daily decoction, his fever resolved and symptoms eased; by day 7, all symptoms disappeared, platelets normalized, and dengue RNA was negative. This case shows modified Yupingfeng Powder quickly relieves early mild symptoms and clears the virus, fitting the "healthy qi deficiency, summer-damp toxin invasion" pathogenesis of such cases.

6.2. Clinical Application of Qingying Decoction in Severe Dengue Fever

A university-affiliated TCM hospital conducted a randomized controlled study (June 2022–October 2023) on 96 severe dengue patients with "heat entering nutrient-blood syndrome" (persistent fever ≥39℃, bleeding, platelets <100×10⁹/L). Patients were split equally: the control group received conventional Western treatment (fluid replacement, paracetamol for fever ≥38.5℃, vitamin C/K1, platelet transfusion if <50×10⁹/L), while the treatment group added Qingying Decoction (30g Bubali Cornu, 15g Rehmanniae Radix, etc.) twice daily for 7 days. The treatment group had shorter antipyretic time (2.1±0.8 vs. 3.5±1.2 days), hemorrhagic symptom relief time (3.2±1.1 vs. 4.8±1.5 days), and platelet recovery time (5.3±1.3 vs. 7.6±1.8 days) (all $P<0.05$), plus a lower severe conversion rate (2.08% vs. 14.58%, $P<0.05$). Vascular tests showed the treatment group had lower VEGF and higher eNOS ($P<0.05$), indicating improved endothelial function. It suggests that Qingying Decoction enhances Western treatment by targeting vascular damage and coagulation issues.

An individualized case involved a 45-year-old female with severe dengue (39.5℃ fever, skin ecchymosis, gingival bleeding, platelets 35×10⁹/L, abnormal coagulation). She received Western treatment (1500mL daily fluid replacement, vitamin C/K1, 1-unit platelets) plus modified Qingying Decoction—Moutan Cortex (10g) and Paeoniae Radix Rubra (10g) added for bleeding, Trichosanthis Radix (12g) and Phragmitis Rhizoma (15g) for oliguria. By day 2, her fever dropped and bleeding stopped; day 4 brought normal temperature and improved platelets; day 7 showed normalized platelets/coagulation and negative RNA. A 1-month follow-up confirmed no recurrence. This case validates modified Qingying Decoction's value in addressing severe dengue complications via syndrome differentiation.

Overall, the above cases demonstrate that TCM formulas like Yupingfeng Powder and Qingying Decoction—applied based on disease stage and syndrome—effectively prevent dengue, relieve mild symptoms, and improve severe outcomes. Their mechanisms (immunity regulation for Yupingfeng Powder, vascular function protection for Qingying Decoction) align with clinical observations, providing practical support for integrating TCM into dengue management.

7. Conclusion

In the final analysis, dengue fever, an acute arboviral disease, spreads rapidly and causes considerable harm. Its global spread and the risk of inducing severe cases have always been a tough nut to crack in the field of public health. Nowadays, Western medicine has made limited progress in vaccine development and improving specific immunity, which further highlights the urgency of finding more prevention and control methods.

From the perspective of TCM, although the term "dengue fever" is not directly mentioned in ancient medical books, it can be classified into the category of "pestilence", grasping the key to its onset: "insufficient healthy qi allowing epidemic pathogenic factors to invade". The principle of "When healthy qi is abundant internally, pathogenic factors cannot invade" from Huangdi Neijing not only clarifies the root cause of the disease – that the strength of healthy qi is crucial in resisting

pathogenic factors – but also points out the way for prevention and treatment. Whether using formulas like Yupingfeng Powder, which can tonify qi and stabilize the body surface, to strengthen the defense of weiqi, or flexibly adjusting prescriptions such as Xiaochaihu Decoction according to specific symptoms based on the pathogenesis of "shaoyang syndrome complicated with summer heat", the core is to focus on "protecting healthy qi". This not only embodies the TCM wisdom of "preventing diseases before they occur" but also reveals the advantages of treating diseases based on syndrome differentiation and using medicines flexibly.

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