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# Traditional Chinese Medicine against COVID-19

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### 《中医药抗击新冠肺炎精选论文集》

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# Foreword by Editor-in-Chief

## 主编卷首语

In China's battle against the coronavirus disease (COVID-19), Traditional Chinese Medicine (TCM) has proved effective in improving the overall condition of patients, relieving symptoms, and shortening course of disease. As a result, TCM treatment has been applied in China in a wide-spread, thorough and high-profile way that has never been seen since the founding of the People's Republic of China in 1949. Dating back thousands of years, this traditional treatment method is coming back as a great highlight in China's anti-epidemic campaign and a significant contributor to China's initial victory. As the virus is raging all over the world, TCM is assisting and inspiring the whole world as a potent measure along with Western medicine, providing the Chinese wisdom and experience to addressing the global crisis.

TCM is a unique medical system for developing clinical formulas based on the extraction of syndrome elements and analysis of its etiology and pathogenesis. In TCM diagnosis and treatment, COVID-19 falls into "dampness-toxin pestilence" with a prolonged course of disease, featuring thick and greasy tongue coating, and typical symptoms like wheezing and dyspnea, poor appetite, and diarrhea. In general, the disease is mainly located in the lung and spleen and possibly damages other zang-fu organs as the disease develops, with the core pathogenesis of qi blockage. Accordingly, TCM therapies for COVID-19 include removing toxin and resolving dampness, clearing heat and relieving dyspnea, combined with descending turbid and dredging fu-organs and replenishing qi and dredging collaterals. In TCM treatment protocols, formulas are prescribed on a case-by-case base depending on patients' syndrome and course of disease. Numerous clinical trials have demonstrated the remarkable efficacy of TCM in treating COVID-19.

This anthology is a collection of 70 outstanding articles on COVID-19 treatment with TCM. They are selected from nearly 800 articles published since January 29, 2020 in Chinese medical journals digitally open-access on China National Knowledge Infrastructure

在中国抗击新型冠状病毒肺炎 (COVID-19) 疫情中, 中医药对改善患者全身状况、减轻症状, 缩短病程有良好疗效, 其参与面之广、参与度之深、受关注程度之高, 是新中国成立以来前所未有的, 成为此次疫情防控的一大亮点, 为中国取得抗疫阶段性胜利做出了重要贡献。当前随着全球疫情蔓延, 中医药正在助力世界各国, 与西医优势互补、协同作战, 给世界带来了中国温暖, 贡献了中国力量。

中医药的特点是通过提取证候要素, 分析病因病机, 最终制定临床处方。新冠肺炎归属中医的“湿毒疫”, 病程延长, 舌苔整体厚腻, 症多见喘憋、纳差、腹泻等。主要病位在肺、脾。随着疾病进展, 可出现不同脏腑的受损。核心病机是湿毒郁闭。因此, 中医对新冠肺炎的核心治法是解毒化湿、清热平喘, 兼以降浊通腑, 益气通络。中医方案根据个体差异、病程变化, 辨证施药, 众多“鲜活”的临床案例见证了中医药对新冠肺炎的显著疗效。

本书是从2020年1月29日至今首发在中国知网(CNKI)的我国医药期刊上的有关中医药抗击新冠病毒肺炎的近800篇论文中, 通过中华中医药学会

(CNKI) platform. These articles bearing practical significance in guiding clinical treatment of the pandemic were selected by an expert panel organized by the China Association of Chinese Medicine. Focusing on clinical diagnosis and treatment of COVID-19, the anthology presents a summary of cases of severe and critical patients, as well as elderly and child patients, and patients with complex complications who achieved significant improvement or cure with TCM, supported by scientific methodologies and objective evidence. This anthology is expected to provide effective experience and methods from China's TCM community for worldwide front-line medical staff and scientific, practical and updated literature for the global TCM medical professionals.

As a common enemy of mankind, the virus does not respect borders. In this race against death, every TCM treatment protocol and every piece of experience are hard-won and valuable for all mankind. As a member of the TCM medical profession, I had the opportunity to provide TCM treatment in Wuhan, the epicenter of COVID-19 in China, for three months. I was immensely proud of TCM's contribution to Wuhan's victory in the fight. We stand ready with worldwide medical workers to promote TCM application and development, and make every endeavor to secure a final global victory in the fight against COVID-19.

Editor-in-chief: *HUANG Luqi*

组织的专家撷英荟萃，遴选出对世界范围内临床抗击新冠肺炎具有实践指导意义的论文 70 篇。论文以新冠肺炎临床诊疗实践内容为主，其中不乏有临床重型或危重型患者、高龄老人或儿童患者、或复杂并发症患者的显效或治愈案例，有科学的方法学支持和客观统计证据。本书提供中英版本，以冀为全球奋战在抗疫一线的医务人员提供来自中国中医药学界的有效经验和方法，并对从事中医药工作的各国人士提供有科学性、实用性的最新文献资料。

病毒没有国界，是全人类的共同敌人。此次在新冠肺炎救治过程中，中国中医药救治方案及经验来之不易，是全人类弥足珍贵的财富。作为中医药人，我在武汉第一线亲身参与了中医药施治工作近 3 个月，我为中医药赢得武汉保卫战所作出的贡献，感到无比的骄傲和自豪。我们愿携手各国医药同仁，共同推进中医药在全世界的应用与发展，为抗击疫情的全球胜利做出最大努力。

主编：黄璐琦

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## Clinical Observation on 34 Patients with Novel Coronavirus Pneumonia (COVID-19) Treated with Integrated Traditional Chinese and Western Medicine

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**Abstract: Objective** To investigate the clinical efficacy of integrated traditional Chinese and western medicine in the treatment of novel coronavirus pneumonia (COVID-19) by retrospectively analyzing the clinical records of 52 patients. **Methods** The data of patients with COVID-19 from Hubei Provincial Hospital of Integrated Traditional Chinese and Western Medicine from January 15, 2020 to February 8, 2020 were collected to investigate and analyze the basic information, traditional Chinese medical syndromes, laboratory tests, and treatment methods. The patients were divided into two groups according to the intervention, namely a western medicine group of 18 cases treated with anti-virus, anti-infection and assisted supportive drugs, and an integrated treatment group of 34 cases treated with Chinese medicine decoctions, Chinese patent medicines and Chinese medicine injections in addition to the western medicine group. The clinical symptom disappearance time, recovery time of body temperature, disappearance rate of other accompanying symptoms, average length of hospital stay, clinical recovery rate, and mortality rate were compared between groups. **Results** The 52 patients included 23 male patients and 29 female patients; the average age was  $(54.00 \pm 12.83)$  years old; the time from onset to hospitalization was  $(7.44 \pm 2.99)$  days. The main symptoms included fever (75%), fatigue (61.5%), cough (50%), and other symptoms (34.6%). According to the conditions at the time of admission, there were 76.9% moderate patients, 19.2% severe patients, and 3.8% critical patients. The main syndrome types in traditional Chinese medicine (TCM) were dampness-toxin stagnating in the lung (30.8%), pestilence-toxin blocking the lung (25.0%), dampness-heat-toxin accumulation in the lung (21.2%), pathogenic heat congesting in the lung (19.2%) and internal blockade and external collapse (3.8%). Laboratory testing showed the following results: the lymphocytes percentage  $(18.53 \pm 11.01)\%$ , serum amyloid A  $(111.65 \pm 76.98)$  mg/L, C-reactive protein  $(31.34 \pm 21.99)$  mg/L and erythrocyte sedimentation rate  $(22.60 \pm 15.65)$  mm/H. The clinical symptom disappearance time  $[(5.15 \pm 1.68)$  d], body temperature recovery time  $[(2.64 \pm 1.31)$  d], average length of hospital stay  $[(7.38 \pm 2.06)$  d], and TCM syndrome scale score  $[(13.29 \pm 3.79)$  points] of the integrated treatment group were significantly lower than those in the western medicine group ( $P < 0.05$  or  $P < 0.01$ ). When the patients were discharged from hospital, the accompanying symptom disappearance rate (87.9%), the clinical recovery rate (91.2%), and the incidence of moderate patients developed to severe type (5.9%) in the integrated treatment group were significantly superior to those in the western medicine group (the corresponding results 38.9%, 61.1%, and 33.3% respectively,  $P < 0.05$  or  $P < 0.01$ ). **Conclusion** The treatment of integrated traditional Chinese and western medicine can significantly alleviate the clinical symptoms, shorten the course of disease and improve the recovery rate, showing the advantage to use of only western medicine, which is worthy of clinical promotion and application. **DOI:** 10.13288/j.11-2166/r.2020.05.002-en

**Keywords:** novel coronavirus pneumonia; COVID-19; dampness-toxin stagnating in the lung; pestilence-toxin blocking the lung; dampness-heat-toxin accumulation in the lung; pathogenic heat congesting in the lung; integrated traditional Chinese and western medicine therapy

Since December 2019, there were a large number of patients with novel coronavirus disease 2019 (COVID-19) in Wuhan City, Hubei Province. The epidemic developed and spread rapidly to the whole China. Some patients were critically ill and even died. Up to now, COVID-19 has continued to develop, bringing serious harm to Hubei and the whole China. COVID-19 is a novel disease, and there is no specific

drug yet. Symptomatic supportive therapy is the main treatment method in western medicine. Traditional Chinese medicine (TCM) has been used to treat epidemic diseases for thousands of years. Many physicians have made in-depth studies on the etiology, pathogenesis, and syndrome differentiation and treatment. In particular, TCM played an important role in the treatment of severe acute respiratory

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syndrome (SARS) in China in 2003. The National Health Commission of the People's Republic of China (hereinafter abbreviated as National Health Commission) and National Administration of Traditional Chinese Medicine have jointly issued a number of documents to advocate the adoption of integrated traditional Chinese and western medicine to shorten the course of disease, improve the clinical efficacy, and reduce the incidence and fatality rates of critical patients. The clinical diagnosis and treatment of 34 patients with COVID-19, discharged from Hubei Provincial Hospital of Integrated Traditional Chinese and Western Medicine and treated with integrated traditional Chinese and Western medicine within one month, were retrospectively analyzed and compared with 18 cases with monotherapy of western medicine, so as to provide evidence support for the application of integrated traditional Chinese and western medicine.

## 1 Clinical data

### 1.1 Diagnostic criteria

Diagnostic criteria of western medicine: Patients were diagnosed with COVID-19 with reference to the diagnostic criteria of Hubei Province in the Diagnosis and Treatment Protocol for COVID-19 (Trial Versions 3–5) [1–3] jointly issued by the National Health Commission and National Administration of Traditional Chinese Medicine. They were divided into moderate type, severe type, and critical type according to the criteria [3].

Diagnostic and syndrome differentiation criteria of TCM: Patients were diagnosed with lung pestilence with reference to relevant criteria in the references [3–4]. 1) The clinical manifestations of dampness-toxin stagnating in the lung are fever (mainly low fever), hiding fever, dry cough, less sputum, sore throat, fatigue, poor appetite, dark tongue, or slightly red edge with thick and greasy fur, and soggy and rapid pulse. 2) The clinical manifestations of dampness-heat-toxin accumulation in the lung are high fever, dyspnea and short breath, shortness of breath instantly after movement, less sputum with/without hemoptysis, thirst with no desire to drink water, fatigue, poor appetite with/without abdominal distension, constipation, dark red or red tongue with yellow and greasy fur, and slippery and rapid pulse. 3) The clinical manifestations of pestilence-toxin blocking the lung are persistent fever or alternating chills and fever, cough with less sputum or yellow sputum, abdominal distension, constipation, chest distress, shortness of breath, cough, dyspnea, panting instantly after movement, red tongue with yellow and greasy or dry fur, and slippery and rapid pulse. 4) The clinical manifestations of pathogenic heat congesting in the lung are fever, thirst without a desire to drink, chest distress, dry throat, less sputum, poor appetite, inhibited defecation or loose stool, red tip and edges of the tongue with yellow fur, and floating and rapid pulse. 5) The clinical

manifestations of internal blockade and external collapse are dyspnea, panting instantly after movement or requiring assisted ventilation, accompanied by unconsciousness, dysphoria, sweating, cold limbs, purplish dim tongue with thick and greasy fur or dry fur, and rootless floating pulse.

### 1.2 General data

The data of 52 patients with COVID-19 discharged from Hubei Provincial Hospital of Integrated Traditional Chinese and Western Medicine from January 15 to February 8, 2020, were collected. Patients were divided into two groups according to the intervention methods, i.e., a western medicine group ( $n = 18$ ) and an integrated treatment group ( $n = 34$ ). The 52 patients with COVID-19 were 23–82 years old, with the main underlying diseases of hypertension and diabetes and most common clinical symptoms of fever, cough, and fatigue. The main TCM syndrome types of patients on admission were dampness-toxin stagnating in the lung, dampness-heat-toxin accumulation in the lung, and pestilence-toxin blocking the lung, and the majority of cases were classified into the moderate type [3–4]. The clinical data of patients in the two groups are shown in Table 1.

## 2 Methods

### 2.1 Treatment methods

#### 2.1.1 Western medicine group

The patients were administered with antiviral agents (arbidol, ribavirin,  $\alpha$ -interferon, lopinavir/ritonavir, and oseltamivir), anti-infectious agents (moxifloxacin, levofloxacin, azithromycin, cephalosporin, and penicillin drugs), as well as assisted supportive drugs (gamma globulin and methylprednisolone).

#### 2.1.2 Integrated treatment group

The patients were administered with Chinese medicines on the basis of the treatment protocol of the western medicine group after syndrome differentiation, including Chinese medicine decoction, Chinese patent medicine, and Chinese medicine injection.

Shidu Yufei Formula was adopted for the syndrome of dampness-toxin stagnating in the lung. The formula was composed of 15 g of Semen Armeniacae Amarae, 30 g of Talcum, 30 g of Rhizoma Atractylodis, 10 g of Radix Angelicae Dahuricae, 15 g of Rhizoma Pinelliae Preparatum, 15 g of Herba Agastaches, 30 g of Poria, 9 g of Herba Ephedrae, 10 g of Radix et Rhizoma Rhei, 10 g of Periostracum Cicadae (prohibited/restricted in some countries), 15 g of Fructus Arctii, and 10 g of Radix Glycyrrhizae. Huopo Xialing Decoction was given to patients with aversion to cold, hiding fever, and muscular soreness. It was composed of 6 g of Herba Agastaches, 6 g of Cortex Magnoliae Officinalis, 6 g of ginger-processed Rhizoma Pinelliae, 10 g of Poria, 10 g of

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## Pilot Study on the Evaluation Standard of the Curative Effects of Traditional Chinese Medicine on Coronavirus Disease 2019 (COVID-19) Based on Cases Analysis

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**Abstract: Objective** To construct a curative effect evaluation criterion for traditional Chinese medicine (TCM) in treating coronavirus disease 2019 (COVID-19). **Methods** Relevant literature reports on TCM in the treatment of COVID-19 were retrieved to extract the evaluation information for clinical curative effect. The actual clinical data from Wuhan Jinyintan Hospital and General Road Street Health Center of Wuhan were analyzed to obtain the indicators for evaluating TCM curative effects. Based on literature reports and clinical data, the curative effect evaluation indicators for TCM in the treatment of COVID-19 were screened. Besides, based on their capabilities to reflect the body recovery and expert suggestions, the corresponding weights were set up. Also, we put forward the selection principles of curative effect evaluation indicators for TCM in the treatment of COVID-19 and conducted the screening. **Results** Based on comprehensive literature and clinical data analysis, the following indicators could better reflect the body functional recovery after treatment with TCM: fever, cough, shortness of breath, fatigue, anorexia, nausea, chest distress, tongue manifestation and other main syndrome indicators, oxygen saturation (%) on finger pulse oximeter, lymphocyte (LY) count, lymphocyte percentage (LY%), neutrophil (NEUT) count, neutrophil percentage (NEUT%), C-reactive protein (CRP), creatine kinase (CK), creatine kinase isoenzyme (CK-MB), lactate dehydrogenase (LDH) and other laboratory tests as well as chest imaging examination. It was believed that the above indicators could be used as curative effect evaluation indicators for TCM in the treatment of COVID-19. **Conclusion** Curative effects evaluation scale of TCM in the treatment of COVID-19 was designed, followed by the construction of curative effect evaluation indicator system and result judgment criteria. Such criteria will facilitate the subsequent collection of clinical data of TCM and provide a basis for scientific evaluation of the role and advantages of TCM in the treatment of COVID-19. **DOI:** 10.13288/j.11-2166/r.2020.12.001-en

**Keywords:** coronavirus disease 2019 (COVID-19); indicator screening; evaluation questionnaire; evaluation criteria for curative effects of traditional Chinese medicine (TCM)

Traditional Chinese medicine (TCM) has accumulated a great deal of experience in the diagnosis and treatment of infectious diseases, which have long been recognized in China. The first record can be traced back to the oracle bone inscriptions unearthed in Yin Ruins, and the description about “whether pestilence will spread” is also available in the oracle inscriptions of the Shang Dynasty. According to the *Plain Questions-Discussion on Acupuncture Methods (Su Wen-Ci Fa Lun Pian)*, “five kinds of pestilence all can spread from people to people. No matter in children or in adults, the

symptoms are the same”. In the “Preface” of the *Treatise on Cold Damage (Shang Han Lun)*, Zhang Zhongjing from the Eastern Han Dynasty recalled that “previously there were more than 200 people in my clan. In less than ten years since the first year of Jian’an Period, two thirds of them died and seven out of every ten people died of cold damage.” This was a very true portrayal of the infectious disease at that time. Based on his clinical summary of treating exogenous diseases represented by pestilence as well as the previous experience, Zhang Zhongjing compiled the book *Treatise on Cold*

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*Damage (Shang Han Lun)*, which laid the foundation for treatment based on syndrome differentiation in TCM. Afterwards, due to the inheritance and development in the Tang and Song dynasties and further summarization in the Ming and Qing dynasties, the warm disease theory came into being. The history of TCM development is also a history of fighting against epidemic diseases of the Chinese nation. Like Zhang Zhongjing, the medical doctors of all dynasties have been diligently learning ancient classics and collecting classic prescriptions, which contributes to the formation of the unique discipline system for the prevention and treatment of infectious diseases with TCM.

Since the outbreak of coronavirus disease 2019 (COVID-19) in December 2019, TCM has been involved in the treatment. Various regions preliminarily witnessed the good curative effects of TCM in the prevention and treatment of COVID-19, proving the positive role and obvious advantages of TCM. However, there is still a lack of clear standards for evaluating the therapeutic effects of TCM, which makes the benefits of TCM fail to be fully demonstrated. It is urgent to formulate feasible standards for evaluating its therapeutic effects and clarifying the action points of TCM intervention in disease treatment and symptom alleviation, so as to facilitate the collection of clinical data of TCM and provide the evidence for scientific evaluation of the roles and advantages of TCM in the fight against COVID-19 and clinical adoption of better therapies.

TCM attaches great importance to the evaluation of individual curative effects. For example, medical doctors in the past have left a large number of medical records concerning individual diagnosis and treatment. However, the records regarding the evaluation of the curative effects on diseases are less due to the limitation by their own theoretical system and diagnosis and treatment model. On one hand, TCM emphasizes differential treatments for diseases caused by the same pathogen at different stages. TCM syndrome differentiation and classification are conducted based on the symptom cluster resulting from the interaction between pathogens and organic bodies, which is also affected by various factors such as individual constitution and environment. Hence, there must exist certain complexity, diversity, and zonality, making it different from the modern medical system which takes the confirmed pathogen as the basis. On the other hand, the ingredients contained in Chinese medicinals are complex and diverse, enabling them to possess multiple effects, which means that it is difficult to evaluate the curative effects of TCM using the physicochemistry-based evaluation mode. To this end, it is necessary to explore evaluation methods suitable for TCM and figure out the common change law of the organic body after TCM intervention through analysis of data in a large sample size.

We found in the early treatment work that TCM was superior to western medicine in abating fever, alleviating shortness of breath, relieving cough, resisting inflammation, and stabilizing blood oxygen saturation. In addition, some

patients who met the discharge criteria after conventional treatment still had symptoms such as fatigue, cough, anorexia (loss of appetite), and tiredness (mental depression), indicating that the body function had not yet been fully restored. However, these symptoms could be alleviated by TCM intervention, and this is where the TCM advantage lies. Therefore, the indicators that reflect the overall function of the body with TCM characteristics, such as fatigue, anorexia, and burnout, can be used to better evaluate the body state after TCM intervention, thus objectively revealing the disease prognosis. Due to their ubiquity in patients and capability to serve as a powerful supplement to the current discharge criteria, these indicators can not only be used for evaluating the effects of TCM intervention but also as an evidence for rehabilitation after discharge, which is of great significance for patients to recover better and faster. Therefore, in this study, we collected and analyzed the reported case data concerning TCM treatment as well as the actual case data obtained in our first-line treatment of patients with COVID-19 to explore and construct the curative effect evaluation system that conformed to TCM laws, so as to provide a basis for scientific evaluation of the preventive and therapeutic effects of TCM on COVID-19.

## 1 Materials and methods

### 1.1 Analysis of literature data

With the development of this epidemic, scholars in China and abroad have been paying close attention to the 2019 novel coronavirus (2019-nCoV), and many clinical case reports regarding TCM treatment have been successively published. Using “新冠” (COVID-19), “新型冠状病毒” (2019-nCoV), “新型冠状病毒感染肺炎” (novel coronavirus pneumonia), “2019-nCoV”, and “COVID-19” as keywords, we retrieved China National Knowledge Infrastructure (CNKI), PubMed, and Web of Science databases, with the retrieval date set from January 15 to February 26, 2020, to harvest the clinical research reports focusing on the treatment of COVID-19 with TCM or integrated traditional Chinese and western medicine. The reviews and fundamental research reports were excluded. Then the basic information and curative effect evaluation indicators in the clinical research reports were extracted. Through pooled analysis, we figured out the changes in indicators after TCM treatment. According to the improvements in various indicators of patients before and after TCM treatment reported in the literature, as well as those improvements in actual clinical data, we selected the most obvious improvement indicators for evaluating the curative effects. The ability of these indicators to reflect the body’s recovery and the expert opinions were taken into account to set their corresponding weights and other information.

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## Discussion on Traditional Chinese Medicine Prevention and Treatment Strategies of Coronavirus Disease 2019 (COVID-19) from the Perspective of “Cold-dampness Pestilence”

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**Abstract:** The current situation of prevention and treatment of coronavirus disease 2019 (COVID-19) is very severe. Based on case data of actual observation, diagnosis and treatment at designated hospitals, emergency department observation units, fever outpatient clinics, and community health service centers in Wuhan, Academician Tong Xiaolin holds that the infectious disease is “cold-dampness pestilence.” In addition, the background, clinical characteristics and pathogenesis of “cold-dampness pestilence” are systematically explained. At the same time, based on the “cold-dampness pestilence” theory, a stage-based diagnosis and treatment plan for early, middle, severe, and recovery stages was formulated, and a general formula for suspected cases was developed to combat COVID-19 and to provide effective prevention and treatment strategies of traditional Chinese medicine. **DOI:** 10.13288/j.11-2166/r.2020.06.003-en

**Keywords:** cold-dampness pestilence; coronavirus disease 2019; traditional Chinese medicine therapy; Wuhan Kangyi Formula (武汉抗疫方)

Coronavirus disease 2019 (COVID-19) is an acute respiratory infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), with the symptoms of fever, dry cough and fatigue<sup>[1]</sup>. As of 24:00 February 12, 2020, 59,804 confirmed cases and 1,367 deaths had been reported in China<sup>[2]</sup>. Confirmed cases were also reported in Japan, South Korea, the United States, France, Vietnam, Singapore and other countries<sup>[3]</sup>. This pandemic has been declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO)<sup>[4]</sup>. The incubation period of COVID-19 is 1–14 days, mostly 3–7 days. Asymptomatic carriers also show strong transmission ability, leading to a large number of hidden sources of infection and infectors, which increases the difficulty in preventing and controlling the pandemic<sup>[5]</sup>.

Tong Xiaolin, an academician that once participated in the prevention and treatment of severe acute respiratory

syndrome (SARS) in 2003 as the leader of integrated Chinese and western medicine treatment group of China-Japan Friendship Hospital, is well aware of the important role of traditional Chinese medicine (TCM) in the prevention and treatment of fulminant infectious diseases. For example, in SARS patients treated with integrated Chinese and western medicine, the average absorption time of pulmonary shadow was significantly shortened compared with that of pure western medicine group, and those treated with only Chinese medicinals have shown no obvious complications until now<sup>[6]</sup>. Academician Tong Xiaolin conducted a field investigation on confirmed patients in Wuhan Jinyintan Hospital and initially proposed that the disease belonged to “cold-dampness pestilence”<sup>[7]</sup>. After field visits to the wards of multiple designated hospitals, emergency department observation units, fever outpatient clinics and community health service centers in Wuhan, as well as observation,

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diagnosis and treatment of a large number of patients, Tong Xiaolin confirmed his opinion of “cold-dampness pestilence”. The present study systematically summarized the disease name, cause, pathogenesis and treatment as follows.

## 1 The proposal of cold-dampness pestilence

Pestilence is a general term for fulminant infectious diseases in TCM. It was recorded early in Chinese historical materials. For example, *Elucidations of Script and Explanations of Characters (Shuo Wen Jie Zi)* describes that “pestilence is the disease that all people can suffer from”; *Rites of Zhou-Celestial Offices-Chief Minister (Zhou Li-Tian Guan-Zhong Zai)* records that “physicians are responsible for treating the diseases of all people, and epidemics can occur in all the four seasons”; *Plain Questions-Discussion on Acupuncture Methods (Su Wen-Ci Fa Lun Pian)* records that “five kinds of pestilence all can spread from people to people. No matter in children or in adults, the symptoms are the same.... If there is sufficient healthy qi inside the body, the pathogen cannot invade the body. When pestilence has occurred, care should be taken to avoid toxic qi”. COVID-19 is highly contagious and can spread from person to person through droplets and contact. The youngest patients are only a few months old, and the elderly patients are common, which shows that the disease widely spreads. In addition, the symptoms of patients are similar, mainly including fever, dry cough, fatigue, body aches, gastric stuffiness, vomiting and nausea, diarrhea, and constipation. In severe cases, respiratory distress or even shock may occur. From the above, COVID-19 is classified into the category of “pestilence” in TCM.

“Cold-dampness” is proposed regarding the etiology of COVID-19 in TCM. On the one hand, most patients showed obvious cold-dampness stagnation syndrome; on the other hand, Wuhan presented a cold wet climate in the time of the epidemic. According to field investigation on confirmed cases in Wuhan, most patients presented the syndromes of cold-dampness attacking the exterior, obstructing the lung, and disturbing the spleen in the early and middle stages of the disease. Cold-dampness attacking the exterior often causes aversion to cold, fever, and body aches. Cold-dampness obstructing the lung results in chest distress, suffocation, shortness of breath, fatigue, dry cough with little phlegm, and other symptoms of lung failing in dispersion and purification. Cold-dampness disturbing the spleen causes gastric stuffiness, vomiting and nausea, poor appetite, diarrhea, hesitant bowel movement, and other symptoms of spleen failing in transportation and transformation. These patients often have a pale enlarged tongue with teeth mark and thick white greasy or curdy coating. Some may show a dark purple tongue with a yellow coating. The pulse is slippery or soggy. All of these are obvious cold-dampness manifestations. Meteorological statistics (<https://www.weatheronline.cn/>) showed that the

rainfall in January 2020 in Wuhan was 4.6 times the average in the same period of the past 20 years. Continuous rain increased the cold and humidity in Wuhan, and people living there were also affected by it. Moreover, the epidemic occurred in winter, near the first nine days (from December 22 to 30, 2019) of the coldest days following the Winter Solstice. Although the weather was warm in winter in 2019, it was still the coldest day in a year; together with frequent rainy days, the cold-dampness pathogen was inevitable. Furthermore, Tong Xiaolin learned from visiting the community health service centers in Wuchang District, Wuhan that when the weather turned fine and the temperature increased, the number of fever outpatients decreased from more than 100 patients per day to more than 20. This proves that climate indeed affects the incidence of the disease. Cold wet weather is normal in the nature, but if too excessive, it will cause disasters. Like what is said in *The Essence of the Four Sages (Si Sheng Xin Yuan)* that “six qi and five elements exist in the human body. Internal damage of humans is often caused by the abnormality of healthy qi, while external contraction diseases are caused by abnormal qi in the nature affecting healthy qi”. The exuberance of cold-dampness transforms into six excesses, which, together with the seasonal epidemic pathogen, attacks the body. Thus the epidemic has arisen. Considering the clinical characteristics, onset time and climate features observed in Wuhan, Tong Xiaolin put forward treating infected people in Wuhan from the perspective of cold-dampness pestilence.

## 2 Pathogenesis and clinical features of cold-dampness pestilence

COVID-19 is caused by cold-dampness complicated with seasonal epidemic pathogens. Therefore, it is named as cold-dampness pestilence. The disease is mainly located in lung and spleen, with heart, liver and kidney possibly involved. Cold-dampness damaging yang is the main syndrome, combined with deteriorated syndromes of heat transformation, dryness transformation, yin damage, stasis, and block and collapse.

Cold and dampness pathogens in the six excesses often invade the human body with the help of pathogenic wind, attacking the exterior and then the interior. However, cold-dampness combined with the epidemic pathogen takes unusual ways to invade the human body, from immersing body surface, or from mouth and nose, or even affecting directly the lung and spleen, with other zang-fu organs involved. If the pathogenic cold-dampness invades the body surface, the exterior qi will be stagnated. Since the lung governs the exterior, fever, aversion to cold, headache, body pain and other exterior syndrome manifestations will occur. If the pathogenic cold-dampness invades the human body from mouth and nose, the lung will be attacked and its functions of dispersion and purification will be affected, thereby resulting