



Review Article

Herbal medicine and pattern identification for treating COVID-19: a rapid review of guidelines

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ARTICLE INFO

Article history:

Received 19 March 2020

Received in revised form 21 March 2020

Accepted 21 March 2020

Available online 29 March 2020

Keywords:

Coronavirus disease 2019

Pattern identification

Herbal medicine

Chinese medicine

Korean medicine

ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) is pandemic and has caused illness to many people worldwide. This review aimed to summarize and analyze the herbal formulae provided by the guidelines for their pattern identifications (PIs) and compositions of herbs to treat patients with COVID-19.

Methods: We searched 7 data sources for eligible traditional medicine guidelines up to March 6, 2020 and found a total of 28 traditional medicine guidelines that provide treatment measures for COVID-19.

Results: Of the 28 guidelines, there were 26 government-issued Chinese guidelines and 2 Korean guidelines. After standardizing the terminology of the PIs and herbal formulae, there were 8 PIs and 23 herbal formulae for the mild stage, 11 PIs and 31 herbal formulae for the moderate stage, 8 PIs and 21 herbal formulae for the severe stage, and 6 PIs and 23 herbal formulae for the recovery stage in the Chinese guidelines. In the Korean guidelines, there were 4 PIs and 15 herbal formulae for the mild stage, 3 PIs and 3 herbal formulae for the severe stage, and 2 PIs and 2 herbal formulae for the recovery stage. In the frequency analysis of herbs, Glycyrrhizae Radix et Rhizoma, Armeniacae Semen Amarum, Ephedrae Herba, and Gypsum Fibrosum were found to be the herbs with the high frequency of usage in the Chinese guidelines.

Conclusion: This review can be used as guidance for the traditional medicine treatment of COVID-19. Clinical evidence is needed in the future to evaluate the efficacy of traditional medicine.

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1. Introduction

Coronavirus disease 2019 (COVID-19) is a newly identified strain of coronavirus that causes illness ranging from effects similar to the common cold to fatal diseases in people across the world.¹ This disease was first identified in early December 2019, and by the middle of March 2020, the World Health Organization (WHO) assessed COVID-19 as a pandemic.² As of March 2020, there have been more than 178,700 confirmed cases in at least 140 countries. The majority of cases were reported in mainland China, followed by Italy, Iran, Spain and South Korea.³

The common symptoms of COVID-19 include fever, cough, and shortness of breath. In severe cases, pneumonia may occur and ultimately lead to organ failure and even death.⁴ Currently, there are no available vaccines or specific medicines for the treatment of COVID-19. In light of the outbreak, various treatment modalities have been considered, including traditional medicine, which has been widely used during the past epidemic outbreaks, such as severe acute respiratory syndrome (SARS) and H1N1 influenza.⁵ To date, 2 countries, China and South Korea, have issued traditional medicine treatment guidelines on the prevention and treatment of COVID-19. Up to March 2020, there have been 7 versions of diagnosis and treatment guidelines issued by the National Health Commission of China⁶ and 2 versions of guidelines issued in South Korea.⁷

A recent systematic review suggested that “Based on historical records and evidence of SARS and H1N1 influenza prevention, Chinese herbal formula could be an alternative approach for the

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prevention of COVID-19 in high-risk populations”⁵ and it focused on prevention method but not treatment methods. Therefore, we aimed to systematically analyze the herbal formulae in the guidelines for pattern identifications and herbal compositions recommended for treating patients with COVID-19.

2. Methods

2.1. Data sources

The following data sources were searched on February 25, 2020 for eligible traditional medicine guidelines and searched up to March 6 to retrieve the updated version of the guidelines provided:

- Guidelines International Network (G-I-N)⁸
- “Chinese guidelines on Novel Coronavirus” resources⁹ by Evidence Aid
- The official government websites of all 31 provinces in mainland China (including municipal and autonomous regions)
- The Centre for Health Protection of the Hong Kong Special Administrative Region¹⁰
- Association of Korean Medicine and Korean Association of Traditional Pulmonary Medicine
- Japanese Association for Infectious Diseases and Japanese Respiratory Society¹¹
- Taiwan Centers for Disease Control¹²

2.2. Inclusion and exclusion criteria

This study focused on the recommended treatment modalities related to traditional medicine for COVID-19. All guidelines that provide traditional medicine treatment measures were included regardless of language, and publication types and years. Guidelines that only provide preventive measures without treatment measures were excluded.

Herbal formulae related to folk medicine were excluded only and other herbal formulae in these guidelines were included. As the guidelines were outlined based on regional characteristics, regional folk medicines, such as Tibetan medicine in Tibet, Mongolian medicine in Inner Mongolia, and Miao medicine in Guizhou province, were integrated into their guidelines.

2.3. Data extraction and analyses

The data from each included guideline were extracted using a predefined data extraction table. The content of the data extraction tables comprised the stages of the disease, pattern identification, clinical symptoms, therapeutic principle, name and composition of herbal formulae, amount of herbs, and country or province of the provided guideline. The pattern identification and herbal formulae were analyzed according to the severity of the disease (mild, moderate, severe and recovered stages). The frequency of herbs recommended in the herbal formulae for each stage of disease was also computed and analyzed.

2.4. Terminology standardization

The terminology of pattern identification were standardized based on the clinical manifestation provided in the guidelines and Clinic Terminology of Traditional Chinese Medical Diagnosis and Treatment-Syndromes.¹³ The herbal formulae with missing names were also renamed by comparing the compositions of these herbal formulae with other named herbal formulae and double-checked them with the Dictionary of Traditional Chinese Medicine Formula.¹⁴ All the terminologies were also standardized based

on the WHO international standard terminologies for traditional medicine.¹⁵

3. Results

A total of 28 traditional medicine guidelines that provide treatment measures for COVID-19 were found. Of the 28 guidelines, there were 26 government-issued Chinese guidelines and 2 Korean medicine-professional associations-issued Korean guidelines. The Japanese government did not officially issue any traditional medicine guidelines on COVID-19, but they adopted a translated version of the national guideline issued by the National Health Commission of China.

In mainland China, there are currently 7 versions of national diagnosis and treatment guidelines, and traditional medicine content has been included since the third version.⁶ Using the government-issued national guidelines as a reference, 17 provinces, 4 municipalities and 4 autonomous regions in mainland China officially issued traditional medicine-related guidelines for the prevention and treatment of COVID-19. All the guidelines were devised by local health authorities according to regional characteristics and local prevalence of COVID-19 and have been continuously updated since the first issuance.⁵

In Korea, the Association of Korean Medicine and the Korean Association of Traditional Pulmonary Medicine each issued the first version of traditional medicine guidelines on the prevention and treatment of COVID-19 at the end of February 2020.⁷ Both guidelines were drafted by clinical experts who were also regularly updated by both associations to provide clinical guidance for the prevention and treatment of COVID-19 in South Korea.

In the frequency analysis of the herbs used in the herbal formulae for treating patients with COVID-19 according to the patients' disease stages and PIs (Tables 1–5), the results showed that there were 8 PIs and 23 herbal formulae for the mild stage (Table 1); 11 PIs and 31 herbal formulae for the moderate stage (Table 2); 8 PIs and 21 herbal formulae for the severe stage (Table 3); and 6 PIs and 23 herbal formulae for the recovery stage (Table 4) in the Chinese guidelines. The Korean guidelines suggested 4 PIs and 15 herbal formulae for the mild stage, 3 PIs and 3 herbal formulae for the severe stage, and 2 PIs and 2 herbal formulae for the recovery stage (Table 5).

Among the Chinese guidelines, we also found that most of the herbal formulae were recommended once in the respective guidelines. However, 17 herbal formulae were recommended several times by different guidelines, with a slight difference in the herbal compositions. The herbal formulae with the highest frequency of recommendation were the herbal formula of Shen Fu Tang with Su He Xiang Pill or Angong Niu Huang Pill in the severe stage and the combined formula of Xiang Sha Liu Junzi Tang and Li Zhong Pill in the recovery stage. In particular, Angong Niu Huang Pill, Zhi Bao Dan, Zi Xue San, and Su He Xiang Pill were the only prescriptions that were not required in the form of decoction and were only prescribed in the severe stage.

On the other hand, the herbal formula of Qingfei Paidu Tang, which is a combination of 4 different herbal formulae with 21 herbs (Tables 1–4), was recommended by the Chinese national diagnosis and treatment guidelines in the treatment of COVID-19 regardless of disease stage or regional status. This herbal formula was also recommended for the treatment of severe stage in the Korean guidelines (Table 5).

In addition, the frequency of the herbs used in the herbal formulae recommended by the Chinese guidelines for every stage and in total were computed (Fig. 1). The results showed that these formulae contain 12 herbs with a frequency of use 30 or more times in the treatment formulae in all stages. Both *Armeniaca Semen*

Table 1
Herbal medicines and pattern identifications for treating mild stage patients with COVID-19 (Chinese guidelines)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Cold-Dampness Obstructing the Lung	Sang Bei Zhisou San	Mori Radicis Cortex, Fritillariae Thunbergii Bulbus, Stemonae Radix, Asteris Radix et Rhizoma, Cynanchi Stauntonii Rhizoma et Radix, Platycodonis Radix, Schizonepetae Spica, Citri Reticulatae Pericarpium, Armeniacae Semen Amarum, Glycyrrhizae Radix et Rhizoma
	Jia Jian Zhengqi San + Da Yuan Yin + Shen Shu San	Agastachis Herba 10 g, Atractylodis Rhizoma 15 g, Citri Reticulatae Pericarpium 10 g, Magnoliae Officinalis Cortex 10 g, Amomi Tsao-ko Fructus 6 g, Ephedrae Herba 6 g, Osterici seu Notopterygii Radix et Rhizoma 10 g, Zingiberis Rhizoma Recens 10 g, Arecae Semen 10 g
	Jia Jian Zhengqi San ^a + Huo Po Xia Ling Tang	Agastachis Herba 10 g, Atractylodis Rhizoma 15 g, Citri Reticulatae Pericarpium 10 g, Magnoliae Officinalis Cortex 10 g, Amomi Tsao-ko Fructus 6 g, Ephedrae Herba 6 g, Armeniacae Semen Amarum 10 g Osterici seu Notopterygii Radix et Rhizoma 10 g, Zingiberis Rhizoma Recens 10 g, Arecae Semen 10 g
	Qingwen Baidu Yin + Da Yuan Yin + Huo Po Xia Ling Tang + Sheng Jiang San Jing Fang Baidu San	Atractylodis Rhizoma 15 g, Citri Reticulatae Pericarpium 9 g, Pinelliae Rhizoma 9 g, Magnoliae Officinalis Cortex 9 g, Ephedrae Herba 6 g, Agastachis Herba 9 g, Amomi Tsao-ko Fructus 6 g, Osterici seu Notopterygii Radix et Rhizoma 9 g, Coptidis Rhizoma 6 g, Zingiberis Rhizoma Recens 9 g Bupleuri Radix 20 g, Agastachis Herba 10 g, Atractylodis Rhizoma 10 g, Citri Reticulatae Pericarpium 10 g, Magnoliae Officinalis Cortex 10 g, Arecae Semen 15 g, Amomi Tsao-ko Fructus 6 g, Platycodonis Radix 10 g, Gypsum Fibrosum 20 g, Glycyrrhizae Radix et Rhizoma 6 g, Batryticatus Bombyx 10 g, Cicadae Periostracum 5 g
Wind-Cold Assailing the Lung	Jing Fang Baidu San + Jiuwei Qianghuo Pill	Schizonepetae Spica 10 g, Saposhnikoviae Radix 10 g, Osterici seu Notopterygii Radix et Rhizoma 10 g, Perillae Folium 10 g, Atractylodis Rhizoma 12 g, Citri Reticulatae Pericarpium 10 g, Magnoliae Officinalis Cortex 10 g, Amomi Tsao-ko Fructus 6 g, Lithospermi Radix 15 g, Forsythiae Fructus 15 g, Belamcandae Rhizoma 9 g, Dryopteridis Crassirhizomatis Rhizoma 10 g, Agastachis Herba 10 g
	Jing Fang Baidu San + Huo Po Xia Ling Tang	Schizonepetae Spica 15 g, Saposhnikoviae Radix 15 g, Chuanxiong Rhizoma 15 g, Angelicae Dahuricae Radix 15 g, Menthae Herba 10 g, Platycodonis Radix 10 g, Schizonepetae Spica 10 g, Perillae Folium 10 g, Osterici seu Notopterygii Radix et Rhizoma 10 g, Isatidis Folium 10 g, Aurantii Fructus Immaturus 10 g, Citri Reticulatae Pericarpium 10 g, Alpiniae Katsumadai Semen 10 g
Wind-Heat Invading the Lung	Yin Qiao San + Sheng Jiang San	Schizonepetae Spica 15 g, Saposhnikoviae Radix 15 g, Chuanxiong Rhizoma 15 g, Angelicae Dahuricae Radix 15 g, Menthae Herba 15 g, Platycodonis Radix 30 g, Pogostemonis Herba 15 g, Perillae Folium 15 g, Magnoliae Officinalis Cortex 15 g, Atractylodis Macrocephalae Rhizoma 30 g, Pinelliae Rhizoma Praeparatum 15 g, Massa Medicata Fermentata 15 g, Coicis Semen 30 g, Poria Sclerotium 30 g, Myristicae Semen 15 g, Armeniacae Semen Amarum 15 g, Crataegi Fructus 30 g, Dolichoris Semen 30 g, Phragmitis Rhizoma 30 g
	Yin Qiao San ^a	Schizonepetae Spica, Saposhnikoviae Radix, Bupleuri Radix, Cynanchi Stauntonii Rhizoma et Radix, Platycodonis Radix, Agastachis Herba, Magnoliae Officinalis Cortex, Pinelliae Rhizoma, Poria Sclerotium, Atractylodis Rhizoma Macrocephalae, Coicis Semen, Amomi Fructus Rotundus
	Sang Ju Yin + Yin Qiao San	Lonicerae Flos 15 g, Forsythiae Fructus 15 g, Schizonepetae Spica 15 g, Arctii Semen 15 g, Menthae Herba 10 g, Platycodonis Radix 15 g, Armeniacae Semen Amarum 10 g, Cicadae Periostracum 10 g, Batryticatus Bombyx 10 g, Curcumae Longae Rhizoma 10 g, Glycyrrhizae Radix et Rhizoma 6 g
	Yin Qiao San + Huo Po Xia Ling Tang	Lonicerae Flos 15 g, Forsythiae Fructus 15 g, Saposhnikoviae Radix 9 g, Scutellariae Radix 15 g, Arctii Semen 9 g, Platycodonis Radix 9 g, Phragmitis Rhizoma 18 g, Bupleuri Radix 9 g, Citri Reticulatae Pericarpium 9 g, Glycyrrhizae Radix et Rhizoma 6 g
External Cold and Interior Heat Warm Pathogen Invading the Lung	Da Qing Long Tang + Qianjing Weijing Tang	Mori Folium 10 g, Chrysanthemi Flos 10 g, Armeniacae Semen Amarum 10 g, Lonicerae Flos 15 g, Forsythiae Fructus 10 g, Arctii Semen 10 g, Glycyrrhizae Radix et Rhizoma 5 g
	Ma Xing Yi Gan Tang + Sheng Jiang San/Da Yuan Yin/Qianghuo Shengshi Tang Huo Po Xia Ling Tang + Xiao Chaihu Tang	Lonicerae Flos 30 g, Forsythiae Fructus 30 g, Schizonepetae Spica 15 g, Arctii Semen 15 g, Menthae Herba 15 g, Platycodonis Radix 30 g, Armeniacae Semen Amarum 15 g, Pogostemonis Herba 15 g, Magnoliae Officinalis Cortex 15 g, Poria Sclerotium 30 g, Pinelliae Rhizoma Praeparatum 15 g, Amomi Fructus Rotundus 15 g, Coicis Semen 30 g, Dolichoris Semen 30 g, Crataegi Fructus 30 g, Massa Medicata Fermentata 15 g, Phragmitis Rhizoma 30 g
		Ephedrae Herba, Cinnamomi Ramulus, Armeniacae Semen Amarum, Gypsum Fibrosum, Phragmitis Rhizoma, Benincasae Pericarpium, Persicae Semen, Zingiberis Rhizoma Recens, Coicis Semen, Zizyphi Fructus, Glycyrrhizae Radix et Rhizoma
		Ephedrae Herba, Armeniacae Semen Amarum, Coicis Semen, Amomi Tsao-ko Fructus, Magnoliae Officinalis Cortex, Arecae Semen, Lasiosphaera seu Calvatia, Nelumbinis Folium, Artemisiae Annuae Herba, Forsythiae Fructus, Osterici seu Notopterygii Radix et Rhizoma, Atractylodis Rhizoma, Platycodonis Radix, Rhei Rhizoma Preparata cum Vinum
	Agastachis Herba 10 g, Magnoliae Officinalis Cortex 10 g, Pinelliae Rhizoma Praeparatum 10 g, Poria Sclerotium 15 g, Bupleuri Radix 15 g, Scutellariae Radix 10 g, Codonopsis Pilosulae Radix 10 g, Armeniacae Semen Amarum 10 g, Coicis Semen 20 g, Polyporus 10 g, Alismatis Rhizoma 10 g, Amomi Fructus Rotundus 10 g, Sojae Semen Praeparatum 10 g, Tetrapanacis Medulla 10 g, Zingiberis Rhizoma Recens 5 g, Zizyphi Fructus 5 g	
	Armeniacae Semen Amarum 12 g, Talcum 15 g, Tetrapanacis Medulla 6 g, Amomi Fructus Rotundus 5 g, Lophatheri Herba 10 g, Magnoliae Officinalis Cortex 6 g, Coicis Semen 20 g, Pinelliae Rhizoma Praeparatum 6 g, Batryticatus Bombyx 6 g, Curcumae Longae Rhizoma 9 g, Cicadae Periostracum 6 g, Atractylodis Rhizoma 6 g, Scutellariae Radix 10 g, Artemisiae Annuae Herba 10 g, Bupleuri Radix 15 g, Moslae Herba 12 g, Forsythiae Fructus 15 g	

Table 1 (Continued)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
	Huo Po Xia Ling Tang + Ma Xing Yi Gan Tang Sang Ju Yin + Yin Qiao San	Not reported
	Xiao Chaihu Tang + Sang Xin Tang + Jiuwei Qianghuo Tang + Huoxiang Zhengqi San Ganlu Xiaodu Dan + Huoxiang Zhengqi San Ma Xing Yi Gan Tang ^a + Da Yuan Yin	Mori Folium, Chrysanthemi Flos, Platycodonis Radix, Armeniacae Semen Amarum, Forsythiae Fructus, Phragmitis Rhizoma, Glycyrrhizae Radix et Rhizoma, Menthae Herba, Lonicerae Flos, Lophatheri Herba, Schizonepetae Spica, Sojae Semen Preparatum Bupleuri Radix 15 g, Pinelliae Rhizoma Praeparatum 9 g, Scutellariae Radix 9 g, Zizyphi Fructus 9 g, Zingiberis Rhizoma Recens 9 g, Mori Radicis Cortex 12 g, Armeniacae Semen Amarum 9 g, Fritillariae Thunbergii Bulbus 9 g, Adenophorae Radix 9 g, Gardeniae Fructus 9 g, Sojae Semen Preparatum 6 g, Scrophulariae Radix 12 g, Forsythiae Fructus 9 g, Glycyrrhizae Radix et Rhizoma 9 g, Agastachis Herba, Perillae Folium, Platycodonis Radix, Menthae Herba, Forsythiae Fructus, Phragmitis Rhizoma, Talcum, Atractylodis Rhizoma Macrocephalae, Poria Sclerotium, Citri Reticulatae Pericarpium, Magnoliae Officinalis Cortex, Glycyrrhizae Radix et Rhizoma Ephedrae Herba 6 g, Gypsum Fibrosum 15 g, Armeniacae Semen Amarum 9 g, Osterici seu Notopterygii Radix et Rhizoma 15 g, Lepidii seu Descurainiae Semen 15 g, Dryopteridis Crassirhizomatis Rhizoma 9 g, Lumbricus 15 g, Cynanchi Paniculati Radix 15 g, Agastachis Herba 15 g, Eupatorii Herba 9 g, Atractylodis Rhizoma 15 g, Poria Sclerotium 45 g, Atractylodis Macrocephalae Rhizoma 30 g, Hordei Fructus Germinatus 9 g, Crataegi Fructus 9 g, Massa Medicata Fermentata 9 g, Magnoliae Officinalis Cortex 15 g, Arecae Semen 9 g, Amomi Tsao-ko Fructus 9 g, Zingiberis Rhizoma Recens 15 g
	Ma Xing Yi Gan Tang + Sheng Jiang San + Da Yuan Yin	Ephedrae Herba 9 g, Armeniacae Semen Amarum 9 g, Amomi Tsao-ko Fructus 10 g, Arecae Semen 10 g, Cicadae Periostracum 6 g, Astragali Radix 15 g, Forsythiae Fructus 15 g, Atractylodis Rhizoma 15 g, Platycodonis Radix 15 g, Scutellariae Radix 12 g, Arctii Semen 10 g, Glycyrrhizae Radix et Rhizoma 6 g
	San Ren Tang + Huo Po Xia Ling Tang	Armeniacae Semen Amarum 10 g, Amomi Fructus Rotundus 15 g, Pinelliae Rhizoma Zingibere et alumine 15 g, Citri Reticulatae Pericarpium 10 g, Poria Sclerotium 15 g, Coicis Semen 20 g, Tetrapanacis Medulla 15 g, Agastachis Herba 15 g, Magnoliae Officinalis Cortex 15 g, Atractylodis Macrocephalae Rhizoma 15 g, Smilacis Rhizoma 20 g, Lophatheri Herba 15 g, Phragmitis Rhizoma 15 g, Zingiberis Rhizoma Recens 10 g, Glycyrrhizae Radix et Rhizoma 10 g
	Ma Xing Yi Gan Tang + Sheng Jiang San + Da Yuan Yin	Ephedrae Herba 5–10 g, Armeniacae Semen Amarum 5–10 g, Amomi Tsao-ko Fructus 5–10 g, Arecae Semen 5–10 g, Cicadae Periostracum 6–12 g, Forsythiae Fructus 10–20 g, Atractylodis Rhizoma 10–20 g, Scutellariae Radix 10–15 g, Coicis Semen 10–15 g, Glycyrrhizae Radix et Rhizoma 5–10 g
Heat Pathogen Assailing the Lung	Da Yuan Yin ^a	Ephedrae Herba, Armeniacae Semen Amarum, Amomi Tsao-ko Fructus, Arecae Semen, Cicadae Periostracum, Forsythiae Fructus, Atractylodis Rhizoma, Platycodonis Radix, Scutellariae Radix, Arctii Semen, Glycyrrhizae Radix et Rhizoma
	Ma Xing Shi Gan Tang + Da Yuan Yin Yin Qiao San + Qingwen Baidu Yin Yin Qiao San + Ma Xing Shi Gan Tang	Arecae Semen 10 g, Amomi Tsao-ko Fructus 10 g, Magnoliae Officinalis Cortex 10 g, Anemarrhenae Rhizoma 10 g, Scutellariae Radix 10 g, Bupleuri Radix 10 g, Paeoniae Radix Rubra 10 g, Forsythiae Fructus 15 g, Artemisiae Annuae Herba 10 g, Atractylodis Rhizoma 10 g, Isatidis Folium 10 g, Glycyrrhizae Radix et Rhizoma 5 g
	Ma Xing Shi Gan Tang + Xiao Chaihu Tang	Ephedrae Herba 8 g, Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30 g, Glycyrrhizae Radix et Rhizoma 10 g, Arecae Semen 10 g, Magnoliae Officinalis Cortex 10 g, Amomi Tsao-ko Fructus 10 g, Anemarrhenae Rhizoma 10 g, Paeoniae Radix 10 g, Scutellariae Radix 15 g
Dampness Encumbering the Exterior and Interior	Ma Xing Yi Gan Tang + Da Yuan Yin + Sheng Jiang San + Xiang Ru Yin Huo Po Xia Ling Tang ^a + Yin Qiao San	Not reported
	Ma Xing Yi Gan Tang ^a + Huo Po Xia Ling Tang	Forsythiae Fructus, Lonicerae Flos, Platycodonis Radix, Menthae Herba, Arctii Semen, Lophatheri Herba, Phragmitis Rhizoma, Sojae Semen Preparatum, Ephedrae Herba, Gypsum Fibrosum, Armeniacae Semen Amarum, Bupleuri Radix, Cicadae Periostracum, Glycyrrhizae Radix et Rhizoma
	Ma Xing Shi Gan Tang + Xiao Chaihu Tang	Ephedrae Herba 5–10 g, Armeniacae Semen Amarum 5–10 g, Gypsum Fibrosum 30–50 g, Forsythiae Fructus 10–20 g, Scutellariae Radix 5–10 g, Bupleuri Radix 10–15 g, Coicis Semen 10–15 g, Magnoliae Officinalis Cortex 5–10 g, Poria Sclerotium 10–15 g, Glycyrrhizae Radix et Rhizoma 5–10 g
	Ma Xing Yi Gan Tang + Da Yuan Yin + Sheng Jiang San + Xiang Ru Yin Huo Po Xia Ling Tang ^a + Yin Qiao San	Ephedrae Herba 6 g, Armeniacae Semen Amarum 15 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 10 g, Cicadae Periostracum 10 g, Forsythiae Fructus 20 g, Atractylodis Rhizoma 10 g, Platycodonis Radix 10 g, Scutellariae Radix 15 g, Coicis Semen 20 g, Arctii Semen 15 g, Moslae Herba 12 g
	Ma Xing Yi Gan Tang ^a + Huo Po Xia Ling Tang	Agastachis Herba 15 g, Perillae Folium 15 g, Sojae Semen Preparatum 15 g, Atractylodis Rhizoma 15 g, Magnoliae Officinalis Cortex 10 g, Angelicae Decursivae Radix 15 g, Bupleuri Radix 15 g, Scutellariae Radix 10 g, Artemisiae Annuae Herba 20 g, Armeniacae Semen Amarum 10 g, Osterici seu Notopterygii Radix et Rhizoma 10 g, Lonicerae Flos 15 g, Forsythiae Fructus 15 g
Pathogen Invading the Stomach and Intestines No specific PI	Wang Shi Lian Po Yin + Huo Po Xia Ling Tang Qingfei Paidu Tang	Ephedrae Herba 6 g, Armeniacae Semen Amarum 9 g, Coicis Semen 18 g, Amomi Fructus Rotundus 9 g, Agastachis Herba 9 g, Magnoliae Officinalis Cortex 12 g, Pinelliae Rhizoma Praeparatum cum alumine 9 g, Poria Sclerotium 12 g, Polyporus 9 g, Scutellariae Radix 9 g, Forsythiae Fructus 12 g, Glycyrrhizae Radix et Rhizoma 6 g
		Coptidis Rhizoma, Magnoliae Officinalis Cortex, Pinelliae Rhizoma Praeparatum, Agastachis Herba, Poria Sclerotium, Polyporus, Talcum, Amomi Fructus Rotundus, Armeniacae Semen Amarum, Coicis Semen, Tetrapanacis Medulla, Alismatis Rhizoma
		Ephedrae Herba 9 g, Glycyrrhizae Radix et Rhizoma 6 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 15–30 g, Cinnamomi Ramulus 9 g, Alismatis Rhizoma 9 g, Polyporus 9 g, Atractylodis Macrocephalae Rhizoma 9 g, Poria Sclerotium 15 g, Bupleuri Radix 16 g, Scutellariae Radix 6 g, Pinelliae Rhizoma 9 g, Zingiberis Rhizoma Recens 9 g, Asteris Radix 9 g, Farfare Flos 9 g, Belamcandae Rhizoma 9 g, Asari Herba 6 g, Dioscoreae Rhizoma 12 g, Aurantii Fructus 6 g, Citri Reticulatae Pericarpium 6 g, Agastachis Herba 9 g

^a Name of the herbal formula is originally not reported, and the authors named them based on Dictionary of Traditional Chinese Medicine Formula.

Table 2
Herbal medicines and pattern identifications for treating moderate stage patients with COVID-19 (Chinese guidelines)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Warm Heat Pathogen Congesting the Lung	Ma Xing Shi Gan Tang	Ephedrae Herba 6g, Armeniacae Semen Amarum 10g, Gypsum Fibrosum 30g, Glycyrrhizae Radix et Rhizoma 6g, Cicadae Periostracum 6g, Rhei Rhizoma Preparata cum Vinum 6g, Agastachis Herba 10g
	Ma Xing Shi Gan Tang + Yin Qiao San	Ephedrae Herba, Armeniacae Semen Amarum, Gypsum Fibrosum, Mori Radicis Cortex, Lonicerae Flos, Forsythiae Fructus, Scutellariae Radix, Fritillariae Pallidiflorae Bulbus, Glycyrrhizae Radix et Rhizoma, Phragmitis Rhizoma
	Ma Xing Shi Gan Tang ^a + Ganlu Xiaodu Dan + Sangbaipi Yin	Ephedrae Herba, Armeniacae Semen Amarum, Gypsum Fibrosum, Lonicerae Flos, Forsythiae Fructus, Scutellariae Radix, Curcumae longae Radix, Fritillariae Thunbergii Bulbus, Paeoniae Rubra Radix, Arisaematis Rhizoma Preparata cum Bovis Fel, Rhei Rhizoma Preparata cum Vinum, Coicis Semen
	Ma Xing Shi Gan Tang + Ganlu Xiaodu Dan + Sheng Jiang San	Scutellariae Radix 15g, Anemarrhenae Rhizoma 10g, Ephedrae Herba 10g, Armeniacae Semen Amarum 9g, Amomi Fructus Rotundus 6g, Coicis Semen 30g, Mori Radicis Cortex 15g, Atractylodis Rhizoma 10g, Astragali Radix 10g, Lepidii seu Descurainiae Semen 15g
Exterior Cold and Interior Heat Complicated by Dampness	Ma Xing Shi Gan Tang + Chuwen Huadu Tang + Sheng Jiang San	Ephedrae Herba 9g, Armeniacae Semen Amarum 10g, Gypsum Fibrosum 30g, Anemarrhenae Rhizoma 12g, Poria Sclerotium 10g, Phragmitis Rhizoma 30g, Oryzae Semen 30g, Benincasae Pericarpium 30g, Persicae Semen 12g, Fagopyri Radix 30g, Scutellariae Radix 12g, Platycodonis Radix 9g, Pinelliae Rhizoma 9g, Perillae Caulis 12g, Sappan Lignum 12g
	Chaihu Da Yuan Yin + Leng Xiao Pill	Citri Reticulatae Pericarpium 10–15g, Armeniacae Semen Amarum 10–15g, Scutellariae Radix 10–15g, Trichosanthis Pericarpium 10–15g, Poria Sclerotium 15–30g, Agastachis Herba 15g, Magnoliae Cortex 10–20g, Artemisiae Annuae Herba 20–30g, Phragmitis Rhizoma 20–30g, Lonicerae Flos 15–30g, Pseudostellariae Radix 30g, Glycyrrhizae Radix et Rhizoma 5–10g
		Ephedrae Herba 5–10g, Armeniacae Semen Amarum 5–10g, Gypsum Fibrosum 30–50g, Talcum 10–20g, Artemisiae Scopariae Herba 10–30g, Scutellariae Radix 10–15g, Amomi Fructus Rotundus 5–10g, Agastachis Herba 10–15g, Atractylodis Rhizoma 10–15g, Lepidii seu Descurainiae Semen 10–20g, Forsythiae Fructus 10–15g, Batryticatus Bombyx 5–10g, Cicadae Periostracum 6–12g, Curcumae Longae Rhizoma 5–10g, Paeoniae Rubra Radix 10–15g, Glycyrrhizae Radix et Rhizoma 5–10g
Dryness Invading the Lung	Sang Xing Tang + Qingzao Jiufei Tang	Ephedrae Herba 6g, Gypsum Fibrosum 30g, Armeniacae Semen Amarum 10g, Glycyrrhizae Radix et Rhizoma 6g, Batryticatus Bombyx 10g, Curcumae Longae Rhizoma 9g, Cicadae Periostracum 6g, Menthae Herba 6g, Forsythiae Fructus 15g, Lonicerae Flos 15g, Scutellariae Radix 12g, Phragmitis Rhizoma 15g, Coicis Semen 20g, Caryophylli Flos 2g, Fritillariae Cirrhosae Bulbus 6g, Akebiae Caulis 12g, Moschus 0.4g
	Ma Xing Yi Gan Tang	Bupleuri Radix 12g, Magnoliae Cortex 15g, Amomi Tsao-ko Fructus 3g, Scutellariae Radix 15g, Aurantii Fructus 9g, Platycodonis Radix 10g, Arecae Semen 6g, Coicis Semen 20g, Ephedrae Herba 8g, Asari Herba 2g, Alumen 6g, Asteris Radix 15g, Peucedani Radix 15g, Farfarae Flos 15g, Gleditsia Fructus 6g, Bambusae Silicea Concretio 5g, Aconiti Radix Preparata 3g, Moschus 0.4g
Cold-Dampness Obstructing the Lung	Jia Jian Zhengqi San ^a + Da Yuan Yin	Mori Folium 10g, Gypsum Fibrosum 30g, Eriobotryae Folium 30g, Armeniacae Semen Amarum 15g, Ophiopogonis Radix 15g, Rehmanniae Radix 15g, Fritillariae Thunbergii Bulbus 15g, Adenophorae Radix 15g, Glycyrrhizae Radix et Rhizoma 6g
	Yi Jia Jian Zhengqi San	Ephedrae Herba 6g, Armeniacae Semen Amarum 10g, Coicis Semen 30g, Glycyrrhizae Radix et Rhizoma 6g, Agastachis Herba 10g, Belamcandae Rhizoma 10g, Perillae Folium 6g, Atractylodis Rhizoma 3g, Magnoliae Cortex 6g, Citri Reticulatae Pericarpium 12g
Dampness Obstructing Middle Energizer	Qianjing Weijing Tang + San Zi Yangqin Tang + Shengyang Yiwei Tang	Atractylodis Rhizoma 15g, Citri Reticulatae Pericarpium 10g, Magnoliae Cortex 10g, Agastachis Herba 10g, Amomi Tsao-ko Fructus 6g, Ephedrae Herba 6g, Osterici seu Notopterygii Radix et Rhizoma 10g, Zingiberis Rhizoma Recens 10g, Arecae Semen 10g
	Yi Jia Jian Zhengqi San	Phragmitis Rhizoma 20g, Coicis Semen 20g, Benincasae Pericarpium 30g, Persicae Semen 20g, Bupleuri Radix 12g, Citri Reticulatae Pericarpium 12g, Osterici seu Notopterygii Radix et Rhizoma 10g, Pinelliae Rhizoma 12g, Saposhnikoviae Radix 15g, Astragali Radix 15g, Atractylodis Macrocephalae Rhizoma 15g, Panax ginseng Radix 6g, Perilliae Semen 8g, Raphani Semen 12g, Moschus 0.4g
		Agastachis Herba 15g, Magnoliae Cortex 15g, Armeniacae Semen Amarum 10g, Poria Sclerotium 15g, Citri Reticulatae Pericarpium 10g, Massa Medicata Fermentata 15g, Hordei Fructus Germinatus 15g, Artemisiae Scopariae Herba 15g, Arecae Pericarpium 10g, Dolichoris Semen 30g, Glycyrrhizae Radix et Rhizoma 6g, Platycodonis Radix 10g, Coicis Semen 30g
Dampness Obstructing the Lung	Ma Xing Shi Gan Tang ^a + Qingqi Huatan Tang + Sangbaipi Yin	Ephedrae Herba 9g, Armeniacae Semen Amarum 10g, Lepidii seu Descurainiae Semen 20g, Mori Radicis Cortex 30g, Scutellariae Radix 15g, Benincasae Pericarpium 20g, Pinelliae Rhizoma 10g, Magnoliae Cortex 10g, Perilliae Semen 15g, Brassicae Semen 10g, Trichosanthis Pericarpium 15g, Inulae Flos 9g, Cyperi Rhizoma 10g, Curcumae longae Radix 10g, Persicae Semen 10g, Astragali Radix 20g
	Ma Xing Yi Gan Tang + Da Yuan Yin	Ephedrae Herba 10g, Armeniacae Semen Amarum 15g, Coicis Semen 20–30g, Amomi Tsao-ko Fructus 10–20g, Arecae Semen 10–15g, Forsythiae Fructus 10–30g, Atractylodis Rhizoma 10–15g, Magnoliae Cortex 10–15g, Scutellariae Radix 15g, Glycyrrhizae Radix et Rhizoma 5–10g
	Ma Xing Yi Gan Tang + Sheng Jiang San + Da Yuan Yin	Ephedrae Herba, Armeniacae Semen Amarum, Coicis Semen, Amomi Tsao-ko Fructus, Arecae Semen, Cicadae Periostracum, Forsythiae Fructus, Atractylodis Rhizoma, Atractylodis Macrocephalae Rhizoma, Platycodonis Radix, Fritillariae Pallidiflorae Bulbus, Scutellariae Radix
Dampness toxin Congesting the Lung	Ma Xing Yi Gan Tang ^a + Da Yuan Yin	Ephedrae Herba 6g, Armeniacae Semen Amarum 15g, Gypsum Fibrosum 30g, Coicis Semen 30g, Atractylodis Rhizoma 10g, Agastachis Herba 15g, Artemisiae Annuae Herba 12g, Polygoni Cuspidati Rhizoma et Radix 20g, Verbenae Herba 30g, Phragmitis Rhizoma 30g, Lepidii seu Descurainiae Semen 15g, Citri Grandis Rubrum Exocarpium 15g, Glycyrrhizae Radix et Rhizoma 10g

Table 2 (Continued)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Phlegm-Heat Congesting the Lung	Qingwen Baidu Yin ^a + Sheng Jiang San	Ephedrae Herba 9–12 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 30 g, Trichosanthis Fructus 30 g, Scutellariae Radix 12 g, Mori Radicis Cortex 30 g, Fritillariae Thunbergii Bulbus 9 g, Eriobotryae Folium 9 g, Adenophorae Radix 12 g, Cicadidae Periostracum 6 g
	Ma Xing Shi Gan Tang + Ganlu Xiaodu Dan + Sheng Jiang San	Ephedrae Herba 8 g, Armeniacae Semen Amarum 12 g, Gypsum Fibrosum 30 g, Glycyrrhizae Radix et Rhizoma 10 g, Talcum 30 g, Artemisiae Scopariae Herba 20 g, Scutellariae Radix 15 g, Amomi Fructus Rotundus 10 g, Agastachis Herba 15 g, Pinelliae Rhizoma 15 g, Atractylodis Rhizoma 15 g, Lepidii seu Descurainiae Semen 20 g, Forsythiae Fructus 15 g, Batryticatus Bombyx 5 g, Cicadae Periostracum 5 g, Curcumae Longae Rhizoma 10 g, Rhei Radix et Rhizoma 5 g, Paradis Rhizoma 10 g, Moutan Cortex Radicis 15 g, Paeoniae Rubra Radix 15 g, Curcumae longae Radix 15 g, Acori Tatarinowii Rhizoma 15 g, Rehmanniae Radix 15 g, Scrophulariae Radix 15 g
	Xuan Bai Cheng Qi Tang + Huanglian Jiedu Tang + Jiedu Huoxue Tang	Ephedrae Herba 8 g, Armeniacae Semen Amarum 12 g, Gypsum Fibrosum 30 g, Rhei Radix et Rhizoma 10 g, Trichosanthis Fructus 30 g, Persicae Semen 10 g, Paeoniae Rubra Radix 15 g, Lepidii seu Descurainiae Semen 20 g, Coptidis Rhizoma 3 g, Scutellariae Radix 10 g, Mori Radicis Cortex 10 g, Paradis Rhizoma 10 g, Moutan Cortex Radicis 15 g, Curcumae longae Radix 15 g, Acori Tatarinowii Rhizoma 15 g, Rehmanniae Radix 15 g, Scrophulariae Radix 15 g
	Ma Xing Yi Gan Tang + Sheng Jiang San + Da Yuan Yin	Ephedrae Herba 10 g, Armeniacae Semen Amarum 15 g, Gypsum Fibrosum 30 g, Coicis Semen 30 g, Amomi Tsao-ko Fructus 10 g, Arecae Semen 10 g, Cicadae Periostracum 10 g, Forsythiae Fructus 20 g, Atractylodis Rhizoma 15 g, Platycodonis Radix 15 g, Scutellariae Radix 15 g, Arctii Semen 15 g, Glycyrrhizae Radix et Rhizoma 10 g
Epidemic Toxin Blocking the Lung	Ma Xing Shi Gan Tang + Qingqi Huatan Tang	Ephedrae Herba 9 g, Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30–50 g, Glycyrrhizae Radix et Rhizoma 10 g, Fritillariae Thunbergii Bulbus 15 g, Trichosanthis Fructus 15 g, Scutellariae Radix 15 g, Platycodonis Radix 15 g, Aurantii Fructus 15 g, Poria Sclerotium 20 g, Lepidii seu Descurainiae Semen 15 g, Houltuyniae Herba 30 g, Atractylodis Macrocephalae Rhizoma 15 g, Atractylodis Rhizoma 15 g, Citri Reticulatae Pericarpium 10 g, Pinelliae Rhizoma 10 g
	Ma Xing Gan Shi Tang Da Yuan Yin + Sheng Jiang San + Xuan Bai Cheng Qi Tang	Ephedrae Herba 6 g, Ephedrae Herba 6 g, Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 10 g, Atractylodis Rhizoma 10 g, Lepidii seu Descurainiae Semen 10 g, Persicae Semen 10 g, Batryticatus Bombyx 10 g, Cicadae Periostracum 10 g, Curcumae Longae Rhizoma 10 g
	Xuan Bai Cheng Qi Tang + San Xiao Yin + Huo Po Xia Ling Tang	Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30 g, Trichosanthis Fructus 30 g, Rhei Radix et Rhizoma 6 g, Ephedrae Herba 6 g, Lepidii seu Descurainiae Semen 10 g, Persicae Semen 10 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 10 g, Atractylodis Rhizoma 10 g, Agastachis Herba 12 g, Moschus 0.4 g
	Ma Xing Gan Shi Tang ^a + Da Yuan Yin	Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30 g, Trichosanthis Fructus 30 g, Rhei Radix et Rhizoma 6 g, Ephedrae Herba 6 g, Lepidii seu Descurainiae Semen 10 g, Persicae Semen 10 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 10 g, Atractylodis Rhizoma 10 g
Heat Pathogen Assailing the Lung	Ma Xing Shi Gan Tang + Huo Po Xia Ling Tang + Sheng Jiang San + Huanglian Wendan Tang	Ephedrae Herba 6 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 30 g, Agastachis Herba 12 g, Pinelliae Rhizoma 12 g, Poria Sclerotium 15 g, Magnoliae Cortex 12 g, Amomi Fructus Rotundus 12 g, Coicis Semen 30 g, Alismatis Rhizoma 9 g, Sojae Semen Preparatum 12 g, Scrophulariae Radix 12 g, Trichosanthis Radix 12 g, Glycyrrhizae Radix et Rhizoma 9 g
	Xuan Bai Cheng Qi Tang ^a + Da Yuan Yin	Ephedrae Herba 6 g, Ephedrae Herba 6 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 30 g, Lepidii seu Descurainiae Semen 9 g, Trichosanthis Fructus 30 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 12 g, Atractylodis Rhizoma 9 g, Persicae Semen 9 g, Rhei Radix et Rhizoma 6 g
	Xuan Bai Cheng Qi Tang + Huanglian Jiedu Tang	Ephedrae Herba, Armeniacae Semen Amarum, Gypsum Fibrosum, Arisaematis Rhizoma Preparata cum Bovis Fel, Rhei Rhizoma Preparata cum Vinum, Lepidii seu Descurainiae Semen, Bubali Cornu, Persicae Semen, Paeoniae Rubra Radix, Hirudo, Coicis Semen, Glycyrrhizae Radix et Rhizoma
	Ma Xing Shi Gan Tang	Ephedrae Herba 10 g, Gypsum Fibrosum 30 g, Armeniacae Semen Amarum 10 g, Glycyrrhizae Radix et Rhizoma 6 g, Trichosanthis Fructus 30 g, Rhei Radix et Rhizoma 6 g, Lepidii seu Descurainiae Semen 30 g, Perillae Folium 30 g, Amomi Tsao-ko Fructus 6 g, Arecae Semen 6 g, Atractylodis Rhizoma 10 g
No specific PI	Bai Hu Tang + Qingying Tang + Qingwen Baidu Yin	Gypsum Fibrosum 30 g, Scrophulariae Radix 20 g, Rehmanniae Radix 15 g, Moutan Cortex Radicis 15 g, Lophatheri Herba 10 g, Loniceriae Flos 15 g, Forsythiae Fructus 15 g, Scutellariae Radix 15 g, Menthae Herba 20 g, Paeoniae Rubra Radix 15 g, Curcumae longae Radix 15 g, Lepidii seu Descurainiae Semen 10 g, Glycyrrhizae Radix et Rhizoma 10 g
	Ma Xing Shi Gan Tang + Yin Qiao San	Ephedrae Herba 9 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 30 g, Mori Radicis Cortex 15 g, Loniceriae Flos 20 g, Forsythiae Fructus 15 g, Scutellariae Radix 12 g, Fritillariae Thunbergii Bulbus 15 g, Glycyrrhizae Radix et Rhizoma 9 g, Dendrobii Herba 15 g, Panacis Quinquefolii Radix 15 g
		Ephedrae Herba, Armeniacae Semen Amarum, Gypsum Fibrosum, Mori Radicis Cortex, Loniceriae Flos, Forsythiae Fructus, Scutellariae Radix, Fritillariae Thunbergii Bulbus, Glycyrrhizae Radix et Rhizoma
		Ephedrae Herba 10 g, Armeniacae Semen Amarum 10–15 g, Gypsum Fibrosum 20–30 g, Mori Radicis Cortex 15 g, Loniceriae Flos 20–30 g, Forsythiae Fructus 20–30 g, Scutellariae Radix 15 g, Fritillariae Thunbergii Bulbus 15 g, Glycyrrhizae Radix et Rhizoma 5–10 g
	Ephedrae Herba 9 g, Glycyrrhizae Radix et Rhizoma 6 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 15–30 g, Cinnamomi Ramulus 9 g, Alismatis Rhizoma 9 g, Polyporus 9 g, Atractylodis Macrocephalae Rhizoma 9 g, Poria Sclerotium 15 g, Bupleuri Radix 16 g, Scutellariae Radix 6 g, Pinelliae Rhizoma 9 g, Zingiberis Rhizoma Recens 9 g, Asteris Radix 9 g, Farfarae Flos 9 g, Belamcandae Rhizoma 9 g, Asari Herba 6 g, Dioscoreae Rhizoma 12 g, Aurantii Fructus 6 g, Citri Reticulatae Pericarpium 6 g, Agastachis Herba 9 g	

^a Name of the herbal formula is originally not reported, and the authors named them based on Dictionary of Traditional Chinese Medicine Formula.

Table 3
Herbal medicines and pattern identifications for treating severe stage patients with COVID-19 (Chinese guidelines)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Internal Block and External Collapse	Shen Fu Tang + Su He Xiang Pill/Angong Niu Huang Pill	Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 10 g, Corni Fructus 15 g, Su He Xiang Pill/Angong Niu Huang Pill
	Shen Fu Tang ^a + Su He Xiang Pill/Angong Niu Huang Pill/Zi Xue San	Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 10 g, Corni Fructus 15 g, Su He Xiang Pill/Angong Niu Huang Pill/Zi Xue San
	Shen Fu Tang + Su He Xiang Pill/Angong Niu Huang Pill/Shexiang Niu Huang Pill	Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 10 g, Corni Fructus 15 g, Su He Xiang Pill/Angong Niu Huang Pill/Shexiang Niu Huang Pill
	Shen Fu Tang	Panax ginseng Radix, Aconiti Lateralis Radix Praeparata, Asparagi Radix, Ophiopogonis Radix, Rhei Radix et Rhizoma, Lonicerae Flos, Bubali Cornu, Corni Fructus, Schisandrae Fructus, Phragmitis Rhizoma, Glycyrrhizae Radix et Rhizoma
	Sheng Mai San + San Shi Tang + Angong Niu Huang Pill	^a Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 10 g, Acori Tatarinowii Rhizoma 10 g, Curcumae longae Radix 10 g, Corni Fructus 10 g, Schisandrae Fructus 10 g, Zingiberis Rhizoma 15 g, Glycyrrhizae Radix et Rhizoma 10 g
Toxin Blocking the Lung	Si Ni Jia Ren Shen Tang + Angong Niu Huang Pill/Zi Xue San	Panacis Quinquefolii Radix, Ophiopogonis Radix, Schisandrae Fructus, Gypsum Fibrosum, Armeniacae Semen Amarum, Lonicerae Flos, Tetrapanacis Medulla, Bambusae Caulis in Taeniam, Angong Niu Huang Pill
	Si Ni Jia Ren Shen Tang + Zhi Xue San / Su He Xiang Pill/Angong Niu Huang Pill	Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 15 g, Corni Fructus 20 g, Angong Niu Huang Pill/Zi Xue San
	Xuan Bai Cheng Qi Tang	Ginseng Radix 5–10 g, Aconiti Lateralis Radix Praeparata 6–10 g, Corni Fructus 20–25 g, Angong Niu Huang Pill/Zi Xue San
	Ma Xing Shi Gan Tang + Xuan Bai Cheng Qi Tang	Ginseng Radix, Aconiti Lateralis Radix Praeparata, Corni Fructus, Bambusae Silicea Concretio, Angong Niu Huang Pill/Zi Xue San
	Ma Xing Shi Gan Tang + Sang Bei San	Panax ginseng Radix 20–30 g, Aconiti Lateralis Radix Praeparata 30–60 g, Corni Fructus 15–20 g, Zhi Xue San, Su He Xiang Pill/Angong Niu Huang Pill
(Self-prescribed) Tingli Xiefei Tang	Xuan Bai Cheng Qi Tang + Sang Bei San	Armeniacae Semen Amarum 10 g, Gypsum Fibrosum 30 g, Trichosanthis Fructus 30 g, Rhei Radix et Rhizoma 6 g, Ephedrae Herba 6 g, Lepidii seu Descurainiae Semen 10 g, Persicae Semen 10 g, Magnoliae Cortex 10 g, Amomi Tsao-ko Fructus 6 g, Atractylodis Rhizoma 10 g
	Xuan Bai Cheng Qi Tang + Sang Bei San	^a Trichosanthis Fructus 30 g, Curcumae longae Radix 10 g, Lepidii seu Descurainiae Semen 30 g, Salviae Miltiorrhizae Radix 30 g, Lumbricus Corpus 15 g, Bombycis Feces 15 g, Atractylodis Rhizoma 15 g, Polyporus 30 g, Rhei Radix et Rhizoma 10 g, Aurantii Immaturus Fructus 15 g, Gardeniae Fructus 15 g, Panax ginseng Radix 30 g
	(Self-prescribed) Tingli Xiefei Tang	Gypsum Fibrosum, Armeniacae Semen Amarum, Rhei Radix et Rhizoma, Trichosanthis Fructus, Ephedrae Herba, Anemarrhenae Rhizoma, Scutellariae Radix, Phragmitis Rhizoma, Glycyrrhizae Radix et Rhizoma
	Shen Fu Tang	^a Ephedrae Herba 6 g, Armeniacae Semen Amarum 9 g, Gypsum Fibrosum 15 g, Glycyrrhizae Radix et Rhizoma 3 g, Agastachis Herba 10 g, Magnoliae Cortex 10 g, Atractylodis Rhizoma 15 g, Amomi Tsao-ko Fructus 10 g, Pinelliae Rhizoma Praeparatum 9 g, Poria Sclerotium 15 g, Rhei Radix et Rhizoma 5 g, Astragali Radix 10 g, Lepidii seu Descurainiae Semen 10 g, Paeoniae Radix Rubra 10 g
(Self-prescribed) Tingli Xiefei Tang	Xuan Bai Cheng Qi Tang + Sang Bei San	^a Gypsum Fibrosum 45 g, Ephedrae Herba 10 g, Armeniacae Semen Amarum 10 g, Lonicerae Flos 15 g, Anemarrhenae Rhizoma 10 g, Bubali Cornu 30 g, Fritillariae Thunbergii Bulbus 10 g, Trichosanthis Fructus 30 g, Rhei Radix et Rhizoma 10 g, Magnoliae Cortex 15 g, Lumbricus Corpus 20 g, Lepidii seu Descurainiae Semen 20 g, Paeoniae Radix Rubra 20 g, Astragali Radix 20 g
	Shen Fu Tang	Ephedrae Herba, Armeniacae Semen Amarum, Gypsum Fibrosum, Mori Radicis Cortex, Fritillariae Thunbergii Bulbus, Glycyrrhizae Radix et Rhizoma
(Self-prescribed) Tingli Xiefei Tang	Xuan Bai Cheng Qi Tang + Sang Bei San	Armeniacae Semen Amarum, Gypsum Fibrosum, Trichosanthis Fructus, Rhei Radix et Rhizoma, Mori Radicis Cortex, Fritillariae Thunbergii Bulbus
	Shen Fu Tang	Lepidii seu Descurainiae Semen 15 g, Trichosanthis Fructus 9 g, Fagopyri Radix 30 g, Tripterospermi Chinensis Herba 30 g, Scutellariae Radix 30 g, Perillae Fructus 9 g, Allii Macrostemi Bulbus 12 g, Pinelliae Praeparatum cum Zingiberis 12 g, Cinnamomi Ramulus 9 g, Paeoniae Radix Alba 15 g, Chuanxiong Rhizoma 15 g, Brassicae Semen 9 g
(Self-prescribed) Tingli Xiefei Tang	Xuan Bai Cheng Qi Tang + Sang Bei San	Ginseng Radix Rubra 10 g, Aconiti Lateralis Radix Praeparata 10 g, Corni Fructus 30 g, Ophiopogonis Radix 20 g, Notoginseng Radix 10 g
	Shen Fu Tang	

Table 3 (Continued)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
	Shen Fu Tang + Su He Xiang Pill/Angong Niu Huang Pill Xuanbai Chengqi Tang + Huanglian Jiedu Tang + Jiedu Huoxue Tang	Panax ginseng Radix 30g/Panax ginseng Radix 10g, Panacis Quinquefolii Radix 15g, Aconiti Lateralis Radix Praeparata 15g, Su He Xiang Pill/Angong Niu Huang Pill Armeniacae Semen Amarum 9g, Gypsum Fibrosum 30g, Trichosanthis Fructus 15g, Rhei Radix et Rhizoma 6g, Ephedrae Herba 9g, Lepidii seu Descurainiae Semen 15g, Persicae Semen 10g, Paeoniae Radix Rubra 15g, Glycyrrhizae Radix et Rhizoma 9g, Trichosanthis Radix 15g, Ophiopogonis Radix 20g Armeniacae Semen Amarum 5–10g, Gypsum Fibrosum 30–50g, Trichosanthis Fructus 10–15g, Rhei Radix et Rhizoma 3–5g, Ephedrae Herba 5–10g, Lepidii seu Descurainiae Semen 10–20g, Persicae Semen 5–10g, Paeoniae Radix Rubra 10–15g, Glycyrrhizae Radix et Rhizoma 5–10g Armeniacae Semen Amarum 15g, Gypsum Fibrosum 20–30g, Trichosanthis Fructus 15g, Rhei Radix et Rhizoma 5g, Ephedrae Herba 10g, Lepidii seu Descurainiae Semen 15–20g, Persicae Semen 10g, Paeoniae Radix Rubra 15g, Glycyrrhizae Radix et Rhizoma 5–10g Armeniacae Semen Amarum, Gypsum Fibrosum, Trichosanthis Fructus, Rhei Radix et Rhizoma, Ephedrae Herba, Lepidii seu Descurainiae Semen, Persicae Semen, Paeoniae Radix Rubra, Curcumae longae Radix, Glycyrrhizae Radix et Rhizoma
	Qingwen Baidu Yin + Jiedu Huoxue Tang	Bubali Cornu 30g, Rehmanniae Radix 15g, Scutellariae Radix 15g, Moutan Cortex Radicis 15g, Gypsum Fibrosum 30–50g, Gardeniae Fructus 10g, Scrophulariae Radix 15g, Fritillariae Thunbergii Bulbus 15g, Forsythiae Fructus 15g, Anemarrhenae Rhizoma 15g, Platycodi Radix 15g, Salviae Miltiorrhizae Radix 15g, Persicae Semen 15g, Lumbricus Corpus 15g, Chuanxiong Rhizoma 15g, Pseudostellariae Radix 15g, Glycyrrhizae Radix et Rhizoma 10g
Blazing of both qi and nutrient	Qingwen Baidu Yin ^a	Gypsum Fibrosum 30–60g, Anemarrhenae Rhizoma 30g, Rehmanniae Radix 30–60g, Bubali Cornu 30g, Paeoniae Radix Rubra 30g, Scrophulariae Radix 30g, Forsythiae Fructus 15g, Moutan Cortex Radicis 15g, Coptidis Rhizoma 6g, Lophatheri Herba 12g, Lepidii seu Descurainiae Semen 15g, Glycyrrhizae Radix et Rhizoma 6g
Toxin Flowing through Five Viscera	Xiang Sha Liu Junzi Tang + Shen Su Jiangqi Tang	Ginseng Radix 7g, Aucklandiae Radix 6g, Magnoliae Cortex 30g, Perillae Folium 8g, Poria Sclerotium 15g, Atractylodis Rhizoma Macrocephalae 15g, Citri Reticulatae Pericarpium 12g, Glycyrrhizae Radix et Rhizoma 6g, Panax quinquefolius Radix 20g, Aurantii Fructus 10g, Cynanchi Stauntonii Rhizoma et Radix 15g, Panacis Quinquefolii Radix 6g, Fritillariae Thunbergii Bulbus 20g, Moschus 0.4g, Aconiti Lateralis Radix Praeparata 20g, Corni Fructus 20g, Ossa Draconis and Concha Ostreae 20g, Magnetitum 15g, Fluoritum 20g, Glycyrrhizae Radix et Rhizoma 12g, Ginseng Radix 15g, Feces Troglodyteris 12g, Allii Macrostemis Bulbus 12g, Pinelliae Rhizoma 12g, Poria Sclerotium 20g, Zingiberis Rhizoma Recens 5g, Dioscoreae Rhizoma 20g, Lilii Bulbus 15g, Zingiberis Rhizoma 5g, Lycii Fructus 15g, Psoraleae Fructus 12g, Cuscutae Semen 15g, Astragali Radix 15g, Schisandrae Fructus 6g, Persicae Semen 15g, Armeniacae Semen Amarum 15g, Asari Herba 3g, Brassicae Semen 15g, Bambusae Succus 20g, Jujubae Fructus 10 pieces, Salviae Miltiorrhizae Radix 10g, Santali Albi Lignum 3g
Depletion of Essential Qi	Poge Jiuxin Tang + Gualou Xiebai Banxia Tang + Danshen Yin	Ginseng Radix, Aconiti Lateralis Radix Praeparata, Ossa Draconis, Concha Ostreae
Exhaustion of Yin and Collapse Of Yang Toxin Clouding the Orifices	Shen Fu Long Mu Tang Zi Xue Dan/Zhi Bao Dan/Angong Niu Huang Pill/Su He Xiang Pill	Not available
Cold Epidemic Blocking the Lung	Xiao Qinglong Tang	Ephedrae Herba 10g, Paeoniae Radix Alba 10g, Asari Herba 3g, Zingiberis Rhizoma 10g, Glycyrrhizae Radix et Rhizoma 5g, Cinnamomi Ramulus 10g, Schisandrae Fructus 5g, Pinelliae Rhizoma Praeparatum 10g, Lepidii seu Descurainiae Semen 10g, Citri Reticulatae Pericarpium 10g, Atractylodis Rhizoma 10g, Magnoliae Cortex 10g, Codonopsis Pilosulae Radix 10g
No specific PI	Qingfei Paidu Tang	Ephedrae Herba 9g, Glycyrrhizae Radix et Rhizoma 6g, Armeniacae Semen Amarum 9g, Gypsum Fibrosum 15–30g, Cinnamomi Ramulus 9g, Alismatis Rhizoma 9g, Polyporus 9g, Atractylodis Macrocephalae Rhizoma 9g, Poria Sclerotium 15g, Bupleuri Radix 16g, Scutellariae Radix 6g, Pinelliae Rhizoma 9g, Zingiberis Rhizoma Recens 9g, Asteris Radix 9g, Farfare Flos 9g, Belamcandae Rhizoma 9g, Asari Herba 6g, Dioscoreae Rhizoma 12g, Aurantii Fructus 6g, Citri Reticulatae Pericarpium 6g, Agastachis Herba 9g

^a Name of the herbal formula is originally not reported, and the authors named them based on Dictionary of Traditional Chinese Medicine Formula.

Table 4
Herbal medicines and pattern identifications for treating recovery stage patients with COVID-19 (Chinese guidelines)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Dual efficiency of Qi and Yin	Er Chen Tang + Wang Shi Qingshu Yiqi Tang	Panacis Quinquefolii Radix 15 g, Dendrobii Herba 10 g, Ophiopogonis Radix 15 g, Anemarrhenae Rhizoma 9 g, Lophatheri Herba 10 g, Coptidis Rhizoma 6 g, Glycyrrhizae Radix et Rhizoma 6 g, Poria Sclerotium 15 g, Pinelliae Rhizoma Praeparatum 9 g, Citri Exocarpium Rubrum 10 g, Citri Reticulatae Pericarpium 15 g, Hordei Fructus Germinatus 20 g Panacis Quinquefolii Radix 20 g, Dendrobii Herba 10 g, Ophiopogonis Radix 10 g, Anemarrhenae Rhizoma 10 g, Lophatheri Herba 10 g, Coptidis Rhizoma 3 g, Glycyrrhizae Radix et Rhizoma 6 g, Poria Sclerotium 15 g, Pinelliae Rhizoma 10 g, Citri Exocarpium Rubrum 10 g, Citri Reticulatae Pericarpium 10 g, Hordei Fructus Germinatus 30 g
	Shengmai San ^a + Shen Ling Baizhu San	Codonopsis Radix 10 g, Poria Sclerotium 15 g, Atractylodis Macrocephalae Rhizoma 10 g, Citri Reticulatae Pericarpium 10 g, Bambusae Caulis in Taeniam 10 g, Glehniae Radix 15 g, Ophiopogonis Radix 10 g, Schisandrae Fructus 6 g, Albizziae Cortex 15 g, Setariae Fructus Germinatus 15 g, Hordei Fructus Germinatus 15 g, Glycyrrhizae Radix et Rhizoma 6 g
	Buzhong Yiqi Tang ^d + Shashen Maidong Tang Maiwei Buzhong Yiqi Tang	Astragali Radix 15 g, Pseudostellariae Radix 15 g, Lophatheri Herba 15 g, Adenophorae Radix 15 g, Ophiopogonis Radix 15 g, Phragmitis Rhizoma 20 g, Trichosanthis Radix 9 g, Polygonati Odorati Rhizoma 6 g, Imperatae Rhizoma 20 g, Glycyrrhizae Radix et Rhizoma 10 g Pseudostellariae Radix, Ophiopogonis Radix, Schisandrae Fructus, Astragali Radix, Atractylodis Macrocephalae Rhizoma, Citri Reticulatae Pericarpium, Angelicae Sinensis Radix, Glehniae Radix, Armeniaca Semen Amarum, Eriobotryae Folium, Lili Bulbus, Glycyrrhizae Radix et Rhizoma
	Shengmai San	Pseudostellariae Radix 15 g, Ophiopogonis Radix 30 g, Schisandrae Fructus 10 g, Astragali Radix 30 g, Atractylodis Macrocephalae Rhizoma 20 g, Citri Reticulatae Pericarpium 10 g, Angelicae Sinensis Radix 15 g, Glehniae Radix 15 g, Armeniaca Semen Amarum 10 g, Glycyrrhizae Radix et Rhizoma 6 g
	Shashen Maidong Tang ^a	Adenophorae Radix 15 g, Ophiopogonis Radix 15 g, Astragali Radix 15 g, Massa Medicata Fermentata 20 g, Paeoniae Radix Rubra 15 g, Mori Cortex 15 g, Lycii Cortex 15 g, Aurantii Fructus 10 g, Artemisiae Apiaceae Herba 15 g, Rehmanniae Radix Crudus 15 g
	Shashen Maidong Tang ^a + Zhuye Shigao Tang	^a Adenophorae Radix 10 g, Glehniae Radix 10 g, Ophiopogonis Radix 15 g, Panacis Quinquefolii Radix 6 g, Schisandrae Fructus 6 g, Gypsum Fibrosum 15 g, Lophatheri Herba 10 g, Mori Folium 10 g, Phragmitis Rhizoma 15 g, Salviae Miltiorrhizae Radix 15 g, Glycyrrhizae Radix et Rhizoma 6 g ^a Adenophorae Radix 15 g, Ginseng Radix 9 g, Codonopsis Radix 9 g, Pseudostellariae Radix 15 g, Ginseng Radix 9 g, Panacis Quinquefolii Radix 9 g, Asparagi Radix 9 g, Ophiopogonis Radix 9 g, Lophatheri Herba 9 g, Mori Folium 9 g, Cicadae Periostracum 6 g, Lycii Cortex 9 g, Atractylodis Rhizoma 15 g, Setariae Fructus Germinatus 15 g
Spleen-Lung Qi Deficiency	Buzhong Yiqi Tang + Caihu Sugan San Huangqi Liu Junzi Tang	Ginseng Radix Rubra, Astragali Radix praeparata cum melle, Citri Reticulatae Pericarpium, Angelicae Sinensis Radix, Bupleuri Radix, Platycodonis Radix, Corni Fructus, Amomi Fructus, Atractylodis Macrocephalae Rhizoma, Polygoni Multiflori Radix, Coicis Semen Astragali Radix praeparata cum melle 30 g, Amomi Fructus 6 g, Codonopsis Radix 15 g, Poria Sclerotium 15 g, Atractylodis Macrocephalae Rhizoma 10 g, Citri Reticulatae Pericarpium 10 g, Pinelliae Rhizoma 9 g, Agastachis Herba 10 g, Glycyrrhizae Radix et Rhizoma 6 g
	Huangqi Xiangsha Liu junzi Tang Xiang Sha Liu Junzi Tang + Li Zhong Pill	Astragali Radix praeparata cum melle 30 g, Amomi Fructus 6 g, Codonopsis Radix 15 g, Poria Sclerotium 15 g, Citri Reticulatae Pericarpium 10 g, Pinelliae Rhizoma 9 g, Agastachis Herba 10 g Pinelliae Rhizoma Praeparatum 9 g, Citri Reticulatae Pericarpium 10 g, Codonopsis Radix 15 g, Astragali Radix praeparata cum melle 30 g, Poria Sclerotium 15 g, Agastachis Herba 10 g, Amomi Fructus 6 g ^a Citri Reticulatae Pericarpium 10 g, Codonopsis Radix 15 g, Astragali Radix praeparata cum melle 30 g, Poria Sclerotium 15 g, Agastachis Herba 10 g, Amomi Fructus 6 g ^a Pinelliae Rhizoma Praeparatum 9 g, Citri Reticulatae Pericarpium 10 g, Codonopsis Radix 15 g, Astragali Radix praeparata cum melle 30 g, Atractylodis Macrocephalae Rhizoma 10 g, Poria Sclerotium 15 g, Agastachis Herba 10 g, Amomi Fructus 6 g, Glycyrrhizae Radix et Rhizoma 6 g

Table 4 (Continued)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
	Xiang Sha Liu Junzi Tang ^a	Codonopsis Radix 15 g, Astragali Radix praeparata cum melle 30 g, Poria Sclerotium 15 g, Pinelliae Rhizoma Praeparatum 9 g, Citri Reticulatae Pericarpium 9 g, Agastachis Herba 9 g, Amomi Fructus 6 g
	Shen Ling Baizhu San	Panax ginseng 10 g, Atractylodis Macrocephalae Rhizoma 15 g, Poria Sclerotium 15 g, Lablab Semen Album 30 g, Amomi Fructus 6 g, Nelumbinis Semen 30 g, Glycyrrhizae Radix et Rhizoma 6 g, Platycodonis Radix 10 g, Dioscoreae Rhizoma 15 g, Coicis Semen 30 g, Hordei Fructus Germinatus 30 g, Massa Medicata Fermentata 10 g
	Xiang Sha Liu Junzi Tang	Codonopsis Radix 12 g, Astragali Radix 20 g, Pinelliae Rhizoma Praeparatum 9 g, Citri Reticulatae Pericarpium 6 g, Poria Sclerotium 15 g, Oryzae Semen 30 g, Aucklandiae Radix 6 g, Amomi Fructus 5 g, Ophiopogonis Radix 12 g, Moutan Cortex 10 g, Glycyrrhizae Radix et Rhizoma 6 g
Lung-Stomach Yin Deficiency	Bufei Tang + San Zi Yangqin Tang Shashen Maidong Tang	^a Codonopsis Radix 20 g, Astragali Radix praeparata cum melle 20 g, Atractylodis Macrocephalae Rhizoma 15 g, Poria Sclerotium 10 g, Juglandis Semen 6 g, Polygonati Rhizoma 15 g, Glehniae Radix 12 g, Ophiopogonis Radix 10 g, Inulae Flos 6 g, Rubiae Radix 10 g, Curcumae Radix 10 g, Coicis Semen 15 g, Benincasae Semen 20 g, Persicae Semen 12 g, Perillae Fructus 10 g, Dalbergiae Odoriferae Lignun 3 g, Glycyrrhizae Radix et Rhizoma 6 g
	Shengmai Yin ^a + Maimendong Tang	Astragali Radix 15 g, Pseudostellariae Radix 15 g, Corni Fructus 15 g, Aurantii Immaturus Fructus 10 g, Perillae Fructus 10 g, Brassicae Semen 10 g, Schisandrae Fructus 10 g, Persicae Semen 10 g, Carthami Flos 10 g
Dual Damage of Qi and Fluid	Shengyang Yiwei Tang + Zhuye Shigao Tang + Xiao Chaihu Tang + Buzhong Yiqi Tang + Shengmai Yin	Adenophorae Radix 15 g, Ophiopogonis Radix 15 g, Polygonati Odorati Rhizoma 10 g, Lablab Semen Album 20 g, Mori Folium 10 g, Trichosanthis Radix 20 g, Glycyrrhizae Radix et Rhizoma 6 g
Liver Depression and Spleen Deficiency Unclear Residual Heat	Xiaoyao San + Si Ni San	Pseudostellariae Radix/Panacis Quinquefolii Radix 15 g, Ophiopogonis Radix 18 g, Schisandrae Fructus 9 g, Pinelliae Rhizoma Praeparatum 9 g, Citri Reticulatae Pericarpium 9 g, Poria Sclerotium 15 g, Fructus Amomi 6 g, Lablab Semen Album 15 g
	Maimendong Tang + Chaihu Qingzao Tang Zhuye Shigao Tang + Qingzao Jiufei Tang	Astragali Radix 18 g, Codonopsis Radix 9 g, Poria Sclerotium 15 g, Atractylodis Macrocephalae Rhizoma 12 g, Pinelliae Rhizoma Praeparatum 9 g, Paeoniae Radix Alba 9 g, Lophatheri Herba 6 g, Alismatis Rhizoma 12 g, Angelicae Pubescentis Radix 9 g, Notopterygii Rhizoma seu Radix 9 g, Bupleuri Radix 9 g, Scrophulariae Radix 12 g, Trichosanthis Radix 12 g, Glycyrrhizae Radix et Rhizoma 6 g
	Zhuye Shigao Tang + Si Junzi Tang Zhuye Shigao Tang	Bupleuri Radix 6 g, Aurantii Fructus 10 g, Paeoniae Radix Rubra 10 g, Angelicae Sinensis Radix 10 g, Poria Sclerotium 30 g, Atractylodis Macrocephalae Rhizoma 15 g, Menthae Herba 10 g, Glycyrrhizae Radix et Rhizoma 6 g
	Zhuye Shigao Tang + Si Junzi Tang Zhuye Shigao Tang	Panax quinquefolius Radix 20 g, Ophiopogonis Radix 12 g, Citri Reticulatae Pericarpium 12 g, Platycodonis Radix 9 g, Trichosanthis Fructus 12 g, Saposhnikoviae Radix 12 g, Anemarrhenae Rhizoma 10 g, Crassirhizomae Rhizoma 12 g, Atractylodis Rhizoma 6 g
No specific PI	Qingfei Paidu Tang	Lophatheri Herba 15 g, Gypsum Fibrosum 20 g, Pseudostellariae Radix 15 g, Ophiopogonis Radix 20 g, Pinelliae Rhizoma 10 g, Eriobotryae Folium 15 g, Polygonati Odorati Rhizoma 15 g, Scrophulariae Radix 15 g, Armeniacae Semen Amarum 10 g, Glycyrrhizae Radix et Rhizoma 10 g
		Lophatheri Herba 15 g, Gypsum Fibrosum 15–20 g, Pseudostellariae Radix 20–30 g, Ophiopogonis Radix 10–15 g, Pinelliae Rhizoma 10 g, Atractylodis Macrocephalae Rhizoma 15–20 g, Poria Sclerotium 15–20 g, Glycyrrhizae Radix et Rhizoma 5–10 g
		Lophatheri Herba, Gypsum Fibrosum, Pseudostellariae Radix, Ophiopogonis Radix, Pinelliae Rhizoma, Oryzae Semen, Phragmitis Rhizoma, Setariae Fructus Germinatus, Glycyrrhizae Radix et Rhizoma
		Ephedrae Herba 9 g, Glycyrrhizae Radix et Rhizoma 6 g, Armeniacae Amarum Semen 9 g, Gypsum Fibrosum 15–30 g, Cinnamomi Ramulus 9 g, Alismatis Rhizoma 9 g, Polyporus 9 g, Atractylodis Macrocephalae Rhizoma 9 g, Poria Sclerotium 15 g, Bupleuri Radix 16 g, Scutellariae Radix 6 g, Pinelliae Rhizoma 9 g, Zingiberis Rhizoma Recens 9 g, Asteris Radix 9 g, Farfare Flos 9 g, Belamcandae Rhizoma 9 g, Asari Herba 6 g, Dioscoreae Rhizoma 12 g, Aurantii Fructus 6 g, Citri Reticulatae Pericarpium 6 g, Agastachis Herba 9 g

^a Name of the herbal formula is originally not reported, and the authors named them based on Dictionary of Traditional Chinese Medicine Formula.

Table 5
Herbal medicines and pattern identifications for treating patients with COVID-19 (Korean guidelines)

Pattern identification	Name of herbal formula	Composition of herbal formula (Latin name)
Mild		
Exterior heat	Jin角度 Baidu San	Osterici Radix 4 g, Araliae Continentalis Radix 4 g, Bupleuri Radix 4 g, Angelicae Decursivae Radix 4 g, Poria Sclerotium 4 g, Ginseng Radix 4 g, Aurantii Fructus Immaturus 4 g, Platycodi Radix 4 g, Cnidii Rhizoma 4 g, Schizonepetae Spica 4 g, Saposhnikoviae Radix 4 g, Glycyrrhizae Radix et Rhizoma 2 g
	Jiuwei Qianghuo Tang	Osterici Radix 6 g, Saposhnikoviae Radix 6 g, Atractylodis Rhizoma 4.8 g, Cnidii Rhizoma 4.8 g, Angelicae Dahuricae Radix 4.8 g, Scutellariae Radix 4.8 g, Rehmanniae Radix Crudus 4.8 g, Asiasari Radix et Rhizoma 2 g, Glycyrrhizae Radix et Rhizoma 2 g, Zingiberis Rhizoma Crudus 4 g, Zizyphi Fructus 4 g, Allii Fistulosi Bulbus 4 g
	Sang Ju Yin	Armeniacae Semen 8 g, Forsythiae Fructus 6 g, Menthae Herba 3.2 g, Mori Folium 10 g, Chrysanthemi Flos 4 g, Platycodi Radix 8 g, Glycyrrhizae Radix et Rhizoma 3.2 g, Phragmitis Rhizoma 8 g
	Yin Qiao San	Lonicerae Flos 40 g, Forsythiae Fructus 40 g, Platycodi Radix 24 g, Menthae Herba 24 g, Arctii Semen 24 g, Glycine Semen Preparatum 20 g, Glycyrrhizae Radix et Rhizoma 20 g, Lophatheri Herba 16 g, Schizonepetae Spica 16 g
	Gegen Jieji Tang	Puerariae Radix 12 g, Ephedrae Herba 8 g, Scutellariae Radix 8 g, Paeoniae Radix 6 g, Cinnamomi Ramulus 4 g, Glycyrrhizae Radix et Rhizoma 3.2 g, Zingiberis Rhizoma Crudus 4 g, Zizyphi Fructus 4 g
	Daochi Jiangqi Tang	Rehmanniae Radix Crudus 12 g, Akebiae Caulis 8 g, Scrophulariae Radix 6 g, Trichosanthis Semen 6 g, Angelicae Decursivae Radix 4 g, Osterici Radix 4 g, Araliae Continentalis Radix 4 g, Schizonepetae Spica 4 g, Poria Sclerotium 4 g, Saposhnikoviae Radix 4 g, Alismatis Rhizoma 4 g
	Qingjin Jianghuo Tang	Citri Unshius Pericarpium 6 g, Armeniacae Semen 6 g, Poria Sclerotium 4 g, Pinelliae Tuber 4 g, Platycodi Radix 4 g, Fritillariae Thunbergii Bulbus 4 g, Angelicae Decursivae Radix 4 g, Trichosanthis Semen 4 g, Scutellariae Radix 4 g, Gypsum Fibrosum 4 g, Aurantii Fructus Immaturus 3.2 g, Glycyrrhizae Radix et Rhizoma 1.2 g, Zingiberis Rhizoma Crudus 4 g
	Ma Xing Gan Shi Tang)+ Qianjin Weijing Tang + Xiao Xianxiang Tang	Ephedrae Herba 5 g, Armeniacae Semen 10 g, Gypsum Fibrosum 20 g, Glycyrrhizae Radix et Rhizoma 10 g, Phragmitis Rhizoma 20 g, Benincasae Pericarpium 15 g, Coicis Semen 20 g, Persicae Semen 10 g, Trichosanthis Pericarpium 10 g, Scutellariae Radix 10 g, Pinelliae Rhizoma 10 g, Rhei Radix et Rhizoma 5–10 g, Paeoniae Radix 10 g, Aurantii Fructus Immaturus 10 g, Arecae Semen 10 g, Lepidii seu Descurainiae Semen 15 g, Perillae Folium 10 g, Platycodi Radix 10 g, Anemarrhenae Rhizoma 10 g
	Ma Xing Shi Gan Tang + Qing qi Huatan Tang	Ephedrae Herba 9 g, Armeniacae Semen 10 g, Gypsum Fibrosum 30–50 g, Glycyrrhizae Radix et Rhizoma 10 g, Fritillariae Thunbergii Bulbus 15 g, Trichosanthis Fructus 15 g, Scutellariae Radix 15 g, Platycodi Radix 15 g, Aurantii Fructus Immaturus 15 g, Poria Sclerotium 20 g, Lepidii seu Descurainiae Semen 15 g, Houltuyinae Herba 30 g, Atractylodis Rhizoma Alba 15 g, Atractylodis Rhizoma 15 g, Citri Reticulatae Pericarpium 10 g, Pinelliae Rhizoma 10 g
	Dampness	Huoxiang Zhengqi San
Huo Po Xia Ling Tang		Coicis Semen 16 g, Poria Sclerotium 12 g, Armeniacae Semen 12 g, Glycine Semen Preparatum 12 g, Agastachis Herba 8 g, Pinelliae Tuber 6 g, Polyporus 6 g, Alismatis Rhizoma 6 g, Magnoliae Cortex 4 g, Amomi Fructus Rotundus 2.4 g
Da Yuan Yin		Arecae Semen 10 g, Amomi Tsao-ko Fructus 10 g, Magnoliae Cortex 10 g, Anemarrhenae Rhizoma 10 g, Scutellariae Radix 10 g, Bupleuri Radix 10 g, Paeoniae Radix Rubra 10 g, Forsythiae Fructus 15 g, Artemisiae Annuae Herba 10 g, Atractylodis Rhizoma 10 g, Isatidis Folium 10 g, Glycyrrhizae Radix et Rhizoma 5 g
Yin Qiao San + San Ren Tang		Lonicerae Flos 15 g, Forsythiae Fructus 15 g, Platycodi Radix 10 g, Arctii Semen 10 g, Phragmitis Rhizoma 20 g, Menthae Herba 10 g, Armeniacae Semen 10 g, Amomi Fructus Rotundus 6 g, Coicis Semen 20 g, Tetrapanacis Medulla 10 g, Paeoniae Radix 10 g, Pinelliae Rhizoma 10 g, Talcum 20 g, Arecae Semen 10 g, Amomi Tsao-ko Fructus 5 g, Scutellariae Radix 10 g, Glycyrrhizae Radix et Rhizoma 5 g
Cold-Dampness Obstructing the Lung	Gegen Jieji Tang + Buhuanjin Zhengqi San	Puerariae Radix 12 g, Ephedrae Herba 8 g, Scutellariae Radix 8 g, Atractylodis Rhizoma 8 g, Paeoniae Radix 6 g, Cinnamomi Ramulus 4 g, Agastachis Herba 4 g, Pinelliae Tuber 4 g, Citri Unshius Pericarpium 4 g, Magnoliae Cortex 4 g, Glycyrrhizae Radix et Rhizoma 3.2 g, Zingiberis Rhizoma Crudus 4 g, Zizyphi Fructus 4 g
Dampness-Heat Obstructing the Lung	Xiao Chaihu Tang + Buhuanjin Zhengqi San	Bupleuri Radix 12 g, Scutellariae Radix 8 g, Atractylodis Rhizoma 8 g, Pinelliae Tuber 4 g, Ginseng Radix 4 g, Agastachis Herba 4 g, Citri Unshius Pericarpium 4 g, Magnoliae Cortex 4 g, Glycyrrhizae Radix et Rhizoma 2 g, Zingiberis Rhizoma Crudus 4 g, Zizyphi Fructus 4 g
Severe		
No specific PI	Qingfei Paidu Tang	Ephedrae Herba 9 g, Glycyrrhizae Radix et Rhizoma 6 g, Armeniacae Amarum Semen 9 g, Gypsum Fibrosum 15–30 g, Cinnamomi Ramulus 9 g, Alismatis Rhizoma 9 g, Polyporus 9 g, Atractylodis Macrocephalae Rhizoma 9 g, Poria Sclerotium 15 g, Bupleuri Radix 16 g, Scutellariae Radix 6 g, Pinelliae Rhizoma 9 g, Zingiberis Rhizoma Recens 9 g, Asteris Radix 9 g, Belamcandae Rhizoma 9 g, Asari Herba 6 g, Dioscoreae Rhizoma 12 g, Aurantii Fructus 6 g, Citri Unshius Pericarpium 6 g, Agastachis Herba 9 g
Toxin Blocking the Lung	Ma Xing Shi Gan Tang	^a Ephedrae Herba 6 g, Armeniacae Amarum Semen 9 g, Gypsum Fibrosum 15 g, Glycyrrhizae Radix et Rhizoma 3 g, Agastachis Herba 10 g, Magnoliae Cortex 10 g, Atractylodis Rhizoma 15 g, Amomi Tsao-ko Fructus 10 g, Pinelliae Rhizoma Praeparatum 9 g, Poria Sclerotium 15 g, Rhei Radix et Rhizoma 5 g, Astragali Radix 10 g, Lepidii seu Descurainiae Semen 10 g, Paeoniae Radix 10 g
Toxin Blocking the Lung	Shen Fu Tang + Su He Xiang Pill	Ginseng Radix 15 g, Aconiti Lateralis Radix Praeparata 10 g, Corni Fructus 15 g, Su He Xiang Pill
Recovery		
No specific PI	Shen Zhu Jianpi Tang + Shengmai San	Liriopis Tuber 8 g, Ginseng Radix 4 g, Atractylodis Rhizoma Alba 4 g, Poria Sclerotium 4 g, Crataegi Fructus 4 g, Citri Unshius Pericarpium 4 g, Magnoliae Cortex 4 g, Schisandrae Fructus 4 g, Paeoniae Radix 3.2 g, Ponciri Fructus Immaturus 3.2 g, Glycyrrhizae Radix et Rhizoma 2 g, Hordei Fructus Germinatus 2 g, Amomi Fructus 2 g, Massa Medicata Fermentata 2 g, Zingiberis Rhizoma Crudus 4 g, Zizyphi Fructus 4 g
No specific PI	Shen Zhu Jianpi Tang + Qingshu Yiqi Tang	Atractylodis Rhizoma 6 g, Poria Sclerotium 4 g, Atractylodis Rhizoma Alba 3 g, Crataegi Fructus 4 g, Ginseng Radix 3 g, Citri Unshius Pericarpium 3 g, Magnoliae Cortex 4 g, Cimicifugae Rhizoma 4 g, Astragali Radix 4 g, Paeoniae Radix 3.2 g, Ponciri Fructus Immaturus 3.2 g, Alismatis Rhizoma 2 g, Puerariae Radix 2 g, Angelicae Gigantis Radix 2 g, Liriopis Tuber 2 g, Citri Unshius Pericarpium Immaturus 2 g, Glycyrrhizae Radix et Rhizoma 2 g, Hordei Fructus Germinatus 2 g, Amomi Fructus 2 g, Massa Medicata Fermentata 2 g, Phellodendri Cortex 1.2 g, Schisandrae Fructus 9 g

^a Name of the herbal formula is originally not reported, and the authors named them based on Dictionary of Traditional Chinese Medicine Formula.

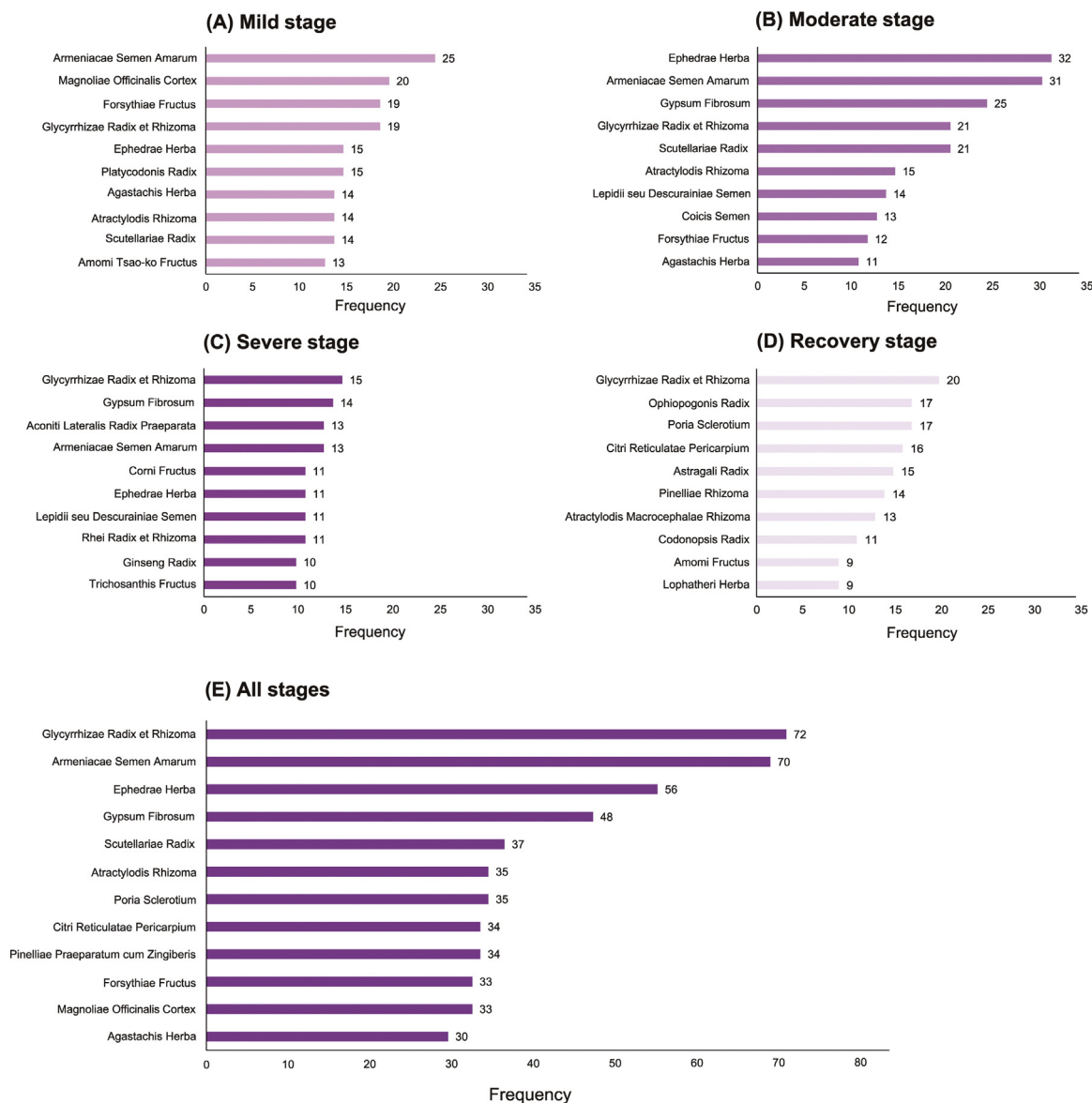


Fig. 1. Frequency of commonly used herbs in the herbal formulae for treating patients with COVID-19 in (A) mild stage; (B) moderate stage; (C) severe stage; (D) recovery stage; (E) all stages.

Amarum and Ephedrae Herba were found to be the top 10 herbs with the highest frequency of use in the mild, moderate and severe stages. The Gypsum Fibrosum and Lepidii seu Descurainiae Semen were also the top 10 most common herbs used in the moderate and severe stages. In addition, Agastachis Herba, Forsythiae Fructus, Atractylodis Rhizoma, and Scutellariae Radix were also highly used in both the mild and moderate stages. Notably, Glycyrrhizae Radix et Rhizoma was found in the top 10 herbs with the highest usage frequency in all four stages. It was also the herb with the highest frequency of usage in total.

4. Discussion

In this review, we systematically summarized and analyzed all the herbal formulae provided by the guidelines according to their pattern identification and herbal compositions. The Chinese medicine herbs used for the prevention of COVID-19 based on 23 provincial guidelines issued in mainland China were reviewed and analyzed in a recent publication.⁵ With reference to it, but in contrast, our review focused on the traditional medicine treatment

measures recommended by all available guidelines. We extended our search of guidelines to nearby countries and reviewed guidelines issued by mainland China (25 provincial guidelines and 1 national guideline) and South Korea to conduct a more comprehensive review.

For the frequency analysis of herbs used in every Chinese guideline for COVID-19, each stage has several herbs that were not shown in the list of top 10 frequently used herbs for other stages. For instance, Magnoliae Officinalis Cortex and Platycodonis Radix could only be seen for the mild stage. Magnoliae Officinalis Cortex is often prescribed for the treatment of various gastrointestinal problems, such as fullness in the stomach, vomiting, and diarrhea from dampness. Platycodonis Radix is usually prescribed for coughs with excessive phlegm and sore throat due to exogenous pathogens.¹⁶ It could be inferred that gastrointestinal symptoms due to dampness and sore throat as well as coughing with sputum are the primary clinical manifestation in the mild stage of COVID-19. The active components contained in these 2 herbs also showed anti-inflammatory benefits in the *in vivo* studies of the acute lung injury model.^{17,18}

In the severe stage, *Aconiti Lateralis Radix Praeparata* and *Rhei Radix et Rhizoma* were identified to be frequently used but not in other stages. This could be due to the extreme PIs and clinical manifestations that are only found in severe patients. *Aconiti Lateralis Radix Praeparata* is known to treat heart failure and has anti-asthmatic and anti-epileptic properties.^{19,20} The combination of *Aconiti Lateralis Radix Praeparata* and *Rhei Radix et Rhizoma* is also highly compatible, and this combination is often used in various herbal formulae. As these herbs have a certain degree of toxicity, they have to be used in caution and preferably are reserved for extreme cases.²¹

Moreover, there are 4 herbal medicines available only in the severe stage. *Angong Niu Huang Pill*, *Zhi Bao Dan*, *Zi Xue San*, and *Su He Xiang Pill* played a significant role in the severe stage treatment. *Angong Niu Huang Pill*, *Zhi Bao Dan*, *Zi Xue San* belongs to the *First Aid Three Treasures of Chinese Medicine*²², which is cold in nature and is used when the patient loses consciousness due to infectious disease-induced heat. In contrast, *Su He Xiang Pill* is an aromatic warm-natured medicine and is used when the patient loses consciousness due to a cold pathogen. All 4 herbal medicines were prescribed in different conditions of extremely severe or critical stages based on the patients' clinical manifestation, and they shared the same therapeutic principle to clear the orifices.

Pinelliae Praeparatum cum Zingiberis and *Citri Reticulatae Pericarpium* were only identified in the list of frequently used herbs in the recovery stage where patients may suffer from white and thin phlegm after their recovery. *Pinelliae Praeparatum cum Zingiberis* and *Citri Reticulatae Pericarpium* are major components of the herbal formula *Er Chen Tang*, which is usually prescribed to clear phlegm and dampness.¹⁶ Another herb, *Ophiopogonis Radix*, is conventionally used for nourishing yin and promoting fluid production. This herb is prescribed for dry cough caused by yin deficiency and is especially suitable for patients in the recovered stage.¹⁶

Glycyrrhizae Radix et Rhizoma is the herb with the highest frequency use overall regardless of disease stage. It is one of the antiviral herbal medicine which is approved by the China Food and Drug Administration (CFDA). Many studies have reported that this herb inhibits viral attachment, entry and replication, which is previously used in combating SARS.^{23,24} Moreover, *Glycyrrhizae Radix et Rhizoma* also has an anti-inflammatory quality which is suitable for the treatment of inflammatory lung condition in COVID-19.²⁵

The herbal formula *Qingfei Paidu Tang* was recommended by both Chinese and Korean guidelines. In the Chinese guidelines, this formula is recommended for all stages. According to a recent publication,²⁶ this herbal formula increases immunology and reduces inflammation by targeting the lung and spleen, which are the disease pathways of COVID-19. However, the herb *Farfarae Flos* was removed in the Korean guidelines due to its safety and toxicity.²⁷

This review has several limitations. First, the results of this review were obtained after standardizing the terms of the PIs and herbal formulae. Therefore, there might be a difference in the terms used in the provided guidelines. Second, this review does not include any direct evidence on the efficacy of traditional medicine in the clinical treatment of COVID-19. The results provided by this review are a summary of the traditional medicine guidelines, which can only be considered as guidance, and clinical verification is still required. Third, although this review summarized the most recent version of the national and provincial guidelines available up to March 6, 2020, the guidelines issued on COVID-19 by the Chinese government are constantly and frequently updated.

In conclusion, this review can be used as a reference in the traditional medicine treatment of COVID-19. Clinical studies are required to evaluate the efficacy and safety of traditional medicine and to provide clinical evidence. The integration of traditional

medicine into conventional treatment may be an alternative approach for the treatment of COVID-19 in the future.

Acknowledgment

The authors thank the American Journal Experts for offering free editing services for this paper as an article on COVID-19.

Author contributions

Conceptualization: HWL and MSL. Methodology: LA and MSL. Software: LA and MSL. Validation: HWL, JYC, and JZ. Formal analysis: LA and HWL. Investigation: LA, HWL and MSL. Resources: MSL. Data curation: HWL and JYC. Writing – original draft: LA and HWL. Writing – review & editing: JYC, JZ and MSL. Visualization: HWL and MSL. Supervision: MSL. Project administration: MSL. Funding acquisition: MSL.

Conflict of interest

The authors declare no conflict of interest.

Funding

This study was supported by the Korea Institute of Oriental Medicine (KSN2013210).

Ethical statement

This research did not involve any human or animal experiment.

Data availability

Data will be made available upon reasonable request.

Supplementary material

Supplementary Table S1. English and Chinese terms of pattern identification, herbal formulae and herbs name can be found in the online version, at <http://dx.doi.org/10.1016/j.imr.2020.100407>.

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