

# Analysis of the Use of Chinese Proprietary Medicines in the Prescriptions of Acute Upper Respiratory Tract Infection in a Hospital from January to June 2021

Qin Tao<sup>1,2</sup>, Jingyue Yu<sup>1</sup>, Xueqin Chen<sup>1</sup>, Huiling Liao<sup>1</sup>, Ling Huang<sup>1</sup>, Liu Yang<sup>1</sup>, Yongquan Lai<sup>2</sup>  
and Haihong Fang<sup>1,\*</sup>

<sup>1</sup>*School of Pharmacy, Jiangxi Science and Technology Normal University, Nanchang 330013, China*

<sup>2</sup>*Gaoxin Hospital of the First Affiliated Hospital of Nanchang University, Nanchang 330000, China*

**Keywords:** Upper Respiratory Tract Infection, Rational Medication Use, Prescription Review, Chinese Proprietary Medicine.

**Abstract:** **Objective** To provide a basic reference for the rational use of medicines for patients in the clinic and improve the safety and reliability of Chinese proprietary medicines in treating acute upper respiratory tract infections (URTI) in our hospital and trace the causes of the improper use of medicines. **Methods** We extracted the outpatient prescriptions for URTI from January to June 2021, and analyzed the basic information of these prescriptions, such as the percentage and amounts of Chinese proprietary medicines and the type of drug combination; the improper prescriptions of Chinese proprietary medicines were confirmed by a pharmacist manual review. **Results** A total of 2279 prescriptions for patients with acute URTI were reviewed, among which 1939 prescriptions contained Chinese proprietary medicines. Minor patients aged from 1 to 17 years accounted for a large portion of the 1939 prescriptions, and the male-female ratio was 1074:865. Among the 1939 prescriptions, 30 Chinese proprietary medicines were used, and the top three were Kanggan Oral Liquid (20%), Chimonanthes nitens Oliv. Leaf Granules (14.78%), and Lan Qin Oral Liquid (14.09%). The combinations of two and three Chinese proprietary medicines were 381 and 69 cases, respectively. And there were four cases that used four kinds of Chinese proprietary medicines simultaneously. The rate of improper prescriptions was 2.27%. **Conclusion** From January to June 2021, the use of Chinese proprietary medicines in the outpatient prescriptions for treating acute URTI in our hospital was basically reasonable. However, attention should be paid to the problems existing in improper prescriptions, and the training in TCM theories should be strengthened.

## 1 INTRODUCTION

Acute upper respiratory tract infection (URTI) is an acute inflammation of patients caused by various viruses or bacteria attacking the upper respiratory tract, such as the nasopharynx and throat. It mainly includes rhinitis, acute tonsillitis, tracheitis, acute pharyngitis, sinusitis, acute herpes pharyngitis, influenza, etc. More than 70% of acute URTI is due to virus infection, and a small portion is due to bacterial infection. Antibiotic treatment is commonly used in Western medicine, and it should be effective (Chinese Medical Association, 2020). However, the hazards of antibiotic abuse are self-evident in the context of increasing bacterial resistance. In contrast, according to Chinese medicine theories, URTI

belongs to external fever and wind-warm lung-heat syndromes. The main principle of treatment is to relieve the exterior syndrome and clear the pathogen. The disease course is generally short and easy to cure. Chinese medicine has a large proportion in the treatment of acute URTI because of its strict formula, precise efficacy, convenience to carry, and ease to take. However, there is often unclear differentiation of symptoms and signs and confusion in clinical use, so the rational application of Chinese proprietary medicines in the prescription of acute URTI needs to be monitored (Fang, 2019).

## 2 MATERIALS AND METHODS

### 2.1 General Methods

A total of 2279 prescriptions for patients with acute URTI issued in our hospital from January to June 2021 were reviewed, among which 1939 prescriptions contained Chinese proprietary medicines. Among these, improper prescriptions of Chinese proprietary medicines were confirmed by a manual review by our pharmacist experts.

### 2.2 Results and Analysis

#### 2.2.1 General Information of Patients

Among the 1939 prescriptions, 1074 cases were male, and 865 cases were female. As for the age

distribution, adults aged 18-60 years (41.83%) accounted for the most, followed by children aged 1-6 years (37.34%) and adolescents aged 7-17 years (14.13%).

### 2.3 Data Statistics

#### 2.3.1 Major Medication Use

A total of 30 Chinese proprietary medicines were used in the reviewed prescriptions. The main medications used were heat-clearing, symptom-relieving, and lung-heat-removing medications and expectorants. The Xiyanping Injection was used in 47 cases (18 cases by intramuscular injection and 29 cases by intravenous drip) and Tanreqing Injection in nine cases (by intravenous drip). The top five medications are shown in Table 1.

Table 1: Top Five Chinese Proprietary Medicines.

Generic name of the medication	Amount used	percentage
Kanggan Oral Liquid	502	20.32%
Chimonanthus nitens Oliv. Leaf Granules	365	14.78%
Lan Qin Oral Liquid	348	14.09%
Xiao'er Baotaikang Granules	254	10.28%
Lung-Clearing and Cough-Stopping Mixture	231	9.35%

#### 2.3.2 Combined Use of Two or More Chinese Proprietary Medicines

Among the 1939 prescriptions, 381 cases used two Chinese proprietary medicines simultaneously. The most frequently used combination was Kanggan Oral Liquid with Xiao'er Baotaikang Granules (41 cases), followed by Compound Codeine Platycodon Tablets with Chimonanthus nitens Oliv. Leaf Granules (39

cases), Compound Codeine Platycodon Tablets with Lan Qin Oral Liquid (27 cases), Chimonanthus nitens Oliv. Leaf Granules with Suhuang Cough-relieving Capsules (20 cases), and Lan Qin Oral Liquid with Suhuang Cough-relieving Capsules (17 cases). In 69 cases, three kinds of Chinese proprietary medicines were used at the same time. In four cases, four kinds of Chinese proprietary medicines were used at the same time.

Table 2: Top 10 Combinations of Two Chinese Proprietary Medicines in Prescriptions and the Frequency of Use.

Two Chinese proprietary medicines used in combination	Frequency of use
Kanggan Oral Liquid + Xiao'er Baotaikang Granules	41
Compound Codeine Platycodon Tablets + Chimonanthus nitens Oliv. Leaf Granules	39
Compound Codeine Platycodon Tablets + Lan Qin Oral Liquid	27
Chimonanthus nitens Oliv. Leaf Granules + Suhuang Cough-relieving Capsules	20
Lan Qin Oral Liquid + Suhuang Cough-relieving Capsules	17
Feilike Mixture + Kanggan Oral Liquid	14
Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules	14
Feilike Mixture + Xiao'er Baotaikang Granules	12
Kanggan Oral Liquid + Lung-Clearing and Cough-Stopping Mixture	11

Table 3: Top 10 Combinations of Three Chinese Proprietary Medicines in Prescriptions and the Frequency of Use.

Combinations of Three Chinese Proprietary Medicines	Frequency of use
Kanggan Oral Liquid + Xiao'er BaotaiKang Granules + Xiao'er Chaigui Tuire Granules	17
Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Suhuang Cough-relieving Capsules	7
Kanggan Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Xiao'er BaotaiKang Granules	5
Feilike Mixture + Kanggan Oral Liquid + Xiao'er BaotaiKang Granules	4
Feilike Mixture + Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules	4
Feilike Mixture + Lianhua Qingwen Capsules + Chimonanthus nitens Oliv. Leaf Granules	4
Chuanwang Xiaoyan Capsules + Lan Qin Oral Liquid + Suhuang Cough-relieving Capsules	3
Chuanwang Xiaoyan Capsules + Chimonanthus nitens Oliv. Leaf Granules + Suhuang Cough-relieving Capsules	3
Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Xiyanning Injection	3
Feilike Mixture + Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Lianhua Qingwen Capsules	2

Table 4: Examples of the Combinations of Four Chinese Proprietary Medicines.

Combinations of Four Chinese Proprietary Medicines
Feilike Mixture + Chimonanthus nitens Oliv. Leaf Granules + Xiyanning Injection + Xiao'er Chaigui Tuire Granules
Chuanwang Xiaoyan Capsules + Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Suhuang Cough-relieving Capsules
Jinhua Qinggan Granules + Lan Qin Oral Liquid + Chimonanthus nitens Oliv. Leaf Granules + Suhuang Cough-relieving Capsules
Kanggan Oral Liquid + Pudilan Anti-inflammatory Oral Liquid + Xiyanning Injection + Xiao'er Chaigui Tuire Granules

### 2.3.3 Analysis of Improper Prescriptions

Among the 1939 prescriptions analyzed, there were 44 improper prescriptions, and the prescription failure rate was 2.27%. The main problems of the improper prescriptions were inadequate syndrome differentiation (71.11%) and contraindications of medications (22.22%), followed by repeated

medication and medication exceeding a normal course. These reviewed prescriptions had a relatively high pass rate, and there were no improper prescriptions with problems such as inappropriate indications and inappropriate dosages, which may be related to the automatic interception of improper prescriptions by our prescription review system in the early stage.

Table 5: Distribution of the number of improper prescriptions.

Distribution of the number of improper prescriptions			
Type	Number of prescriptions	Percentage of the number of improper prescriptions /%	Percentage of the number of all prescriptions /%
Inadequate syndrome differentiation	32	71.11%	1.65%
Contraindications of medications	10	22.22%	0.52%
Medication exceeding a normal course	1	2.22%	0.05%
Repeated use of medications	1	2.22%	0.05%
Total	44	97.78%	2.27%

### 3 DISCUSSION

#### 3.1 Medication Use in Special Populations

Since the physiological systems of children are not fully developed and their pharmacodynamics and pharmacokinetic characteristics are significantly different from those of adults, they cannot be simply considered a reduced version of adults (Jing, 2016). In our hospital, 5.52% of the populations with acute URTI are infants and children under one year of age, and 37.34% are children aged 1-6 years. In contrast, the single doses of Kanggan Oral Liquid (20.32%), Chimonanthus nitens Oliv. Leaf Granules (14.78%), and Lan Qin Oral Liquid (14.09%), which account for the top three medications used, are not suitable for children, who often require a half or 1/3 of a single dose. Inaccurate dosing can easily lead to overdose or underdose. Only very few of the 30 Chinese proprietary medicines in use contained recommendations for dosing for children. In terms of the completeness of the instructions, all Chinese proprietary medicines either lack the recommended dosage for children or contraindications, and it is difficult to see a complete and clear record of adverse reactions.

#### 3.2 Inadequate Syndrome Differentiation

According to the TCM theory, there are three main types of URTI: colds with the wind-cold syndrome, wind-heat syndrome, and summer-dampness syndrome. The treatment of cold with the wind-cold syndrome is removing the wind-cold and application of pungency and warmth to relieve the symptoms. The treatment of cold with the wind-heat syndrome is removing wind-heat and application of pungency and cool to relieve the symptoms. The treatment of summer-dampness evidence relieves the symptoms, resolves dampness, regulates qi-flow, and harmonizes the middle Jiao (Fang, 2019). For example, Kanggan Oral Liquid is suitable for clearing heat and detoxifying toxins for wind-heat colds. It is used for fever, headache, nasal congestion, sneezing, sore throat, general weakness, and aches and pains caused by external wind heat. But it is not suitable for people with wind-cold colds, which are characterized by heavy chill, light fever, no sweating, headache, nasal congestion, runny nose, itchy throat, and cough. Xiao'er Chaigui Tuire Granules are suitable for wind-cold colds by relieving the symptoms, improving

sweating, and clearing the heat. It is used for children with external fever, with the following symptoms: fever, head and body pain, runny nose, thirst, red throat, yellow urine, dry stool, etc. It cannot be used in patients running a high fever with wind-heat colds (Rong, 2017). In this prescription analysis, seven cases of patients who were prescribed a combination of two Chinese proprietary medicines took Kanggan Oral Liquid and Xiao'er Chaigui Tuire Granules simultaneously, and some patients who were prescribed a combination of four Chinese proprietary medicines took Kanggan Oral Liquid, Pudilan Anti-inflammatory Oral Liquid, Xiyanning Injection, and Xiao'er Chaigui Tuire Granules simultaneously.

#### 3.3 Contraindications of the Medications

Xiyanning Injection is contraindicated in infants and children under the age of one year and should be used with caution in children aged 1-2 years (Wang, 2019). During the review, we found that there were still five cases of 1-year-old patients and five cases of 2-year-old patients using Xiyanning Injection in our hospital.

#### 3.4 Medication Exceeding a Normal Course

The recommended medication for pediatric URTI characterized mainly by fever, aching in limbs, headache, and sore throat, is Lianhua Qingwen Capsules. The dosage is one capsule at a time for 3-5 years old children, two capsules at a time for 6-10 years old children, and four capsules at a time for children older than 11 years old, three times a day. Administration for three days can relieve the above symptoms and shorten the time before the abatement of fever (Chinese Journal of Integrative Medicine, 2021). In this review, we found a case in which four boxes of Lianhua Qingwen capsules were prescribed, and the duration of medication was up to eight days at the maximum dose, which obviously exceeded the normal course of medication.

#### 3.5 Route of Administration

One study showed that the incidence of adverse reactions differed between different routes of administration of Xiyanning Injection (1.49% for intramuscular injection and 3.73% for intravenous drip,  $P < 0.05$ , which means the difference is statistically significant) (Liu, 2016). Statistics showed that more patients in our hospital were administered Xiyanning by intravenous drip (29

cases) than by intramuscular injection (18 cases), and the rationality of this needs to be discussed.

### 3.6 Repeated Medication

Among the Chinese proprietary medicines for the treatment of wind-heat colds, there was a high rate of duplication in *Scutellaria baicalensis* Georgi, *Forsythia suspensa*, *Platycodon grandiflorus*, and *Lonicera japonica* Thunb. flowers, and the combined medication may pose a risk of overdose for patients. Some medications contain a toxic component, poppy husk. Modern pharmacological and chemical studies have shown that the main pharmacological components of poppy husk herbs are alkaloids, such as morphine, narcotine, codeine, papaverine, and protopine, which have significant analgesic and anti-cough effects (Nanjing University of Chinese Medicine, 2006; Chinese Pharmacopoeia Commission, 2010). Codeine has pharmacological effects similar to morphine and is an addictive and respiratory depressant. It is one of the ten low addictive narcotic medications considered by the United Nations. Thus, it needs to be considered in the actual administration whether the patient is taking an excessive amount of codeine when using Lung-Clearing and Cough-Stopping Mixture, which contains a certain amount of poppy husk, in combination with Compound Codeine Platycodon Tablets.

## 4 CONCLUSION

Chinese proprietary medicine has been widely used in clinical due to its remarkable curative effect, small toxic side effects and convenient administration. In the outpatient prescriptions of acute URTI in our hospital from January to June 2021, 85% of the prescriptions used Chinese proprietary medicine, and the qualified rate of prescriptions reached 97.73%. The results showed that the use of Chinese proprietary medicines in the prescriptions for treating acute URTI was basically reasonable. Whereas the problems of unreasonable prescriptions should be paid attention to, and the training of TCM theory for physicians should be strengthened. The prescription analysis also found that the proportion of Chinese proprietary medicines in children's use was large. Therefore, attention should be paid to the use of children's drugs. It is suggested that drug R&D enterprises should develop doses suitable for children and improve clinical trials.

## ACKNOWLEDGMENTS

This work was supported by the College Students' Innovative Entrepreneurial Training Plan Program of Jiangxi Science and Technology Normal University (No. 202115041113, No. 20201404119) and the Innovation Special Fund Project of Graduate (No. YC2021-X21).

## REFERENCES

- Chinese Medical Association, Chinese Society of Clinical Pharmacy, Chinese Medical Journals Publishing House, Chinese Society of General Practice, Editorial Board of Chinese Journals of General Practitioners of Chinese Medical Association, Expert Group of Guidelines for Rational Medication in Primary Care Institution. Guideline for rational medication of acute upper respiratory tract infection in primary care [J]. Chinese Journal of General Practitioners, 2020, DOI:10.3760/cma.j.cn114798-20200520-00603.
- Clinical Application Guidance of Chinese Patent Medicine in Treating Dominant Diseases Standardization Project Group. Clinical Application Guidelines on Chinese Patent Medicine in the Treatment for Acute Upper Respiratory Infection in Children (2020) [J]. Chinese Journal of Integrative Medicine, 2021, 41(2):143-150. DOI: 10.7661/j.cjim.20210120.135.
- Chinese Pharmacopoeia Commission. Pharmacopoeia of the People's Republic of China: Notes on Clinical Use of Medicines: Volume of Chinese Medicinal Tablets [S]. 2010 Edition. Beijing: China Medical Science and Technology Press, 2010: 1182.
- Fang B.J., Cui Y.L., Li Z.J., Li Y.P., Yu X.Z., Hu S.X., Wang G, Rui Q.L. Expert consensus on the application of Chinese patent medicines for acute upper respiratory tract infection[J]. Chinese Journal of Integrated Traditional and Western Medicine in Intensive and Critical Care, 2019, (2):129-138. DOI: 10.3969/j.issn.1008-9691.2019.02.001.
- Jing X., Gao J., Wu C.Q., Wang X.S., Wang Q.J. Drug safety evaluation in pediatric population: research advances[J]. Journal of International Pharmaceutical Research, 2016, 43(4):608-614. DOI: 10.13220/j.cnki.jipr.2016.04.006.
- Liu W.Y., Li Y.H., Chi Z.W. Analysis of risk factors for adverse drug reaction (ADR) of Xiyanning Injection in children[J]. Practical Pharmacy and Clinical Remedies, 2016, 19(10):1297-1299,1300. DOI: 10.14053/j.cnki.ppcr.201610023.
- Nanjing University of Chinese Medicine. Dictionary of Chinese medicine: Volume II [M]. 2nd ed. Shanghai: Shanghai Scientific & Technical Publishers, 2006: 3601.
- Rong P., Ma R., Liu Q.H., Yan H.H., Hu S.Y., Li X.M., Zhang X.L., Zheng W.K. A commentary of literature research of traditional Chinese medicine for acute upper

respiratory tract infection in children[J]. China Journal  
of Chinese Materia Medica, 2017, 42(8):1455-1466.  
Wang Z.F., Rong P., Ma R., Xie Y.M., Ding Y., Wang X.F.,  
Zhan S.Y., Li X.H. Expert Consensus on Clinical  
Application of Xiyaping Injection for Children[J].  
China Journal of Chinese Materia Medica, 2019,  
44(14):2932-2936. DOI:  
10.19540/j.cnki.cjmm.20190521.502

