

A Data Mining-Based Study on the Academic Experience of National Master of Traditional Chinese Medicine Xiong Jibai in Treating Insomnia

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Abstract: *Objective:* To explore Professor Xiong Jibai's dialectical thinking characteristics and medication rules in the treatment of insomnia, and to investigate his clinical experience and academic thoughts on the treatment of insomnia, providing references for the clinical diagnosis, treatment, and scientific research of insomnia in traditional Chinese medicine. *Methods:* This study collected 270 cases of insomnia patients diagnosed and treated by Professor Xiong Jibai from January 1, 2020, to December 31, 2024, at the outpatient department of the First Affiliated Hospital of Hunan University of Chinese Medicine. After sorting out standardized terminology, the data were entered into the auxiliary platform for the inheritance of traditional Chinese medicine. Statistical analysis was performed on symptoms, syndromes, drug frequency, four qi (warm, hot, cool, and cold), five flavors (sour, bitter, sweet, spicy, and salty), meridian tropism, and prescriptions. *Results:* The high-frequency symptoms of insomnia patients were frequent dreaming, difficulty falling asleep, easy waking up after sleeping, upset, difficulty sleeping through the night, fatigue, early waking, dizziness, and irritability. The syndrome classifications mainly included six types: phlegm-heat disturbing the spirit syndrome, heart and gallbladder qi deficiency syndrome, liver fire disturbing the heart syndrome, heart and kidney disharmony syndrome, heart and spleen deficiency syndrome, and yin deficiency with fire hyperactivity syndrome. The high-frequency drugs were fried jujube kernel, dragon's teeth, *Poria cocos*, licorice, *Coptis chinensis*, mother-of-pearl, *Pinellia ternata* (prepared), dried tangerine peel, bamboo shavings, and immature bitter orange. The four qi of the drugs were mainly cold, neutral, and warm. The five flavors were predominantly sweet, bitter, and pungent, and most of them were attributed to the heart and spleen meridians, followed by the lung, stomach, and liver meridians. *Conclusion:* Professor Xiong Jibai believes that the disease location of insomnia is mostly in the heart and spleen, and the pathogenesis focuses on phlegm, fire, and deficiency. The treatment mainly focuses on regulating cold and heat, tonifying deficiency, and purging excess. It is advisable to combine with calming and tranquilizing drugs to enhance the curative effect.

Keywords: Insomnia; Data mining; Rules of prescriptions and medications; Xiong Jibai

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1. Introduction

Insomnia, known as sleeplessness in Western medicine, refers to a subjective experience where the quality or quantity of sleep fails to meet normal physiological needs due to difficulties in falling asleep and/or maintaining sleep, thereby affecting daytime social functioning^[1-3]. In recent years, with rapid economic development and gradual improvement in living standards, people's study and work pressures have gradually increased. More and more people are beginning to experience a decline in sleep quality or even insomnia while under pressure, leading to physical and mental illnesses and a decrease in quality of life. According to research by the World Health Organization, approximately 66% of the population now suffers from varying degrees of sleep disorders^[4]. Western medicine has limited effectiveness in treating insomnia and can have certain side effects, which creates resistance among some patients. The clinical efficacy of traditional Chinese medicine (TCM) in treating insomnia is good, with fewer side effects, making it increasingly valued in the treatment of insomnia.

Professor Xiong Jibai is a master of traditional Chinese medicine, a member of the Academic Department of the China Academy of Chinese Medical Sciences, a guiding teacher for the academic experience inheritance work of national veteran experts in traditional Chinese medicine, an honorary professor at Hong Kong Baptist University, a professor at Hunan University of Chinese Medicine, and a doctoral advisor. Professor Xiong has practiced medicine for over 60 years, treating nearly one million patients. He always adheres to the combination of traditional Chinese medical theory and practice, is skilled in syndrome differentiation and treatment, excels in principles, methods, formulas, and medications, and has saved countless lives. The author selected cases of insomnia treated by Professor Xiong Jibai in the outpatient clinic of the First Affiliated Hospital of Hunan University of Chinese Medicine in the past five years. The experience of Professor Xiong in diagnosing and treating insomnia was analyzed using data mining techniques, aiming to explore and inherit Professor Xiong's academic experience in diagnosing and treating insomnia and provide references for the diagnosis and treatment of insomnia in traditional Chinese medicine.

2. Materials

2.1. Source of prescriptions

Collect medical records of 270 insomnia patients who were diagnosed and treated by Professor Xiong Jibai at the outpatient department of the First Affiliated Hospital of Hunan University of Chinese Medicine from January 1, 2020, to December 31, 2024.

2.2. Diagnostic criteria

Diagnostic criteria of traditional Chinese medicine refer to "Internal Medicine of Traditional Chinese Medicine: Insomnia"^[5]: (1) Difficulty falling asleep or waking up easily, frequent dreaming, difficulty falling asleep after waking up (for mild cases), or complete difficulty sleeping through the night (for severe cases); (2) Accompanied by one or more symptoms such as dizziness, headache, palpitations, and forgetfulness.

Diagnostic criteria of Western medicine refer to the "Chinese Classification and Diagnostic Criteria of Mental Disorders (CCMD-3)"^[6]: (1) Difficulty falling asleep, easy waking up, frequent awakening (more than 2 times per night), frequent dreaming, early waking, or taking more than 30 minutes to fall asleep again after waking up, with a total sleep time of less than 6 hours; (2) Impaired social function: symptoms such as

dizziness, fatigue, insufficient energy, tiredness, drowsiness, and inattention during the day. Severe cases may experience decreased cognitive ability, affecting work and study; (3) The above situation occurs at least 3 times a week and lasts for at least 1 month; (4) Exclude secondary insomnia caused by various neurological, psychiatric, and physical diseases.

2.3. Inclusion criteria

(1) Meet the diagnostic criteria of traditional Chinese and Western medicine for insomnia, and insomnia is the main diagnosis; (2) Complete medical records, including common information such as name, gender, age, medical history, tongue and pulse condition, syndrome type, prescription name, medicinal herbs, follow-up visits, etc.; (3) Patients who took the traditional Chinese medicine decoction prescribed by Professor Xiong and did not take other medications for insomnia or sleep disorders during the treatment period.

2.4. Exclusion criteria

(1) Secondary insomnia caused by various neurological, psychiatric, and physical diseases, as well as severe primary diseases involving the cardiovascular, gastrointestinal, liver, kidney, and hematopoietic systems; (2) incomplete medical records; (3) medical record holders who are unwilling to cooperate with data collection. If any one or more of the above three exclusion criteria are met, the case will be considered eligible for exclusion.

2.5. Data standardization and entry

To ensure the consistency of the recorded information, all case information was referenced against the standard textbooks “Diagnostics of Traditional Chinese Medicine” and “Chinese Materia Medica” used in regular higher education for Chinese medicine ^[7–8]. Additionally, Professor Xiong Jibai’s clinical practices were incorporated to convert the symptoms, four diagnostic information, Chinese medicine names, and syndromes recorded in the cases into standard terminology.

The relevant standardized information (gender, age, Traditional Chinese Medicine diagnosis, symptoms, tongue manifestation, pulse manifestation, prescriptions, and medications) from the included cases in this study was entered into the data template and example table of the Traditional Chinese Medicine Inheritance Support Platform System (V2.5). The information was independently entered by two individuals, then checked by a third person to ensure no omissions or errors occurred during the data extraction and entry process.

2.6. Data mining method

Using the “Prescription Statistics” and “Medical Case Statistics” modules of the Traditional Chinese Medicine Inheritance Support Platform from the China Academy of Chinese Medical Sciences, statistical analysis was performed on symptom frequency, syndrome distribution, Chinese medicine frequency, and prescription application. Additionally, the four properties (warm, hot, cool, cold), five tastes (sweet, sour, bitter, pungent, salty), and meridian tropism of the medications were explored.

3. Results

3.1. Symptom frequency statistics

Among the 270 cases of insomnia included in this study, a total of 23 symptoms were observed. There were 9 symptoms with higher frequencies, including: frequent dreaming (238 times), difficulty falling asleep (195

times), waking up easily after sleeping (194 times), restlessness (157 times), difficulty staying asleep through the night (140 times), fatigue (139 times), and early morning awakening (130 times). Other symptoms and their specific frequencies are listed in **Table 1**.

Table 1. Clinical symptom frequency statistics table

No.	Symptom	Frequency	No.	Symptom	Frequency
1	Dreaminess	238	13	Poor appetite	4
2	Difficulty falling asleep	195	14	Lumbago	4
3	Easily awakened after sleep	194	15	Dry throat	3
4	Irritability	157	16	Pruritus	2
5	Sleeplessness all night	140	17	Constipation	2
6	Fatigue	139	18	Sore throat	2
7	Early awakening	130	19	Abdominal distension	2
8	Dizziness	127	20	Frequent nocturia	1
9	Irascibility	68	21	Throat itching	1
10	Spontaneous sweating	37	22	Excessive nocturia	1
11	Headache	19	23	Chest tightness	1
12	Night sweating	4			

3.2. Syndrome type frequency statistics

Among the patients with insomnia included in this study, the most common syndrome types were Phlegm-Heat Disturbing the Spirit Syndrome (133 cases) and Heart and Gallbladder Qi Deficiency Syndrome (105 cases), accounting for 49.3% and 38.9% respectively. This was followed by Liver Fire Disturbing the Heart Syndrome (14 cases, accounting for 5.2%), Disharmony between the Heart and Kidney Syndrome (12 cases, accounting for 4.4%), Deficiency of Both Heart and Spleen Syndrome (4 cases, accounting for 1.5%), and Yin Deficiency with Exuberant Fire Syndrome (2 cases, accounting for 0.7%). **Table 2** shows the syndrome type frequency statistics.

Table 2. Syndrome type frequency statistics table

No.	Syndrome	Frequency	Percentage
1	Phlegm-Heat Disturbing Spirit	133	49.3%
2	Heart-Gallbladder Qi Deficiency	105	38.9%
3	Liver Fire Disturbing Heart	14	5.2%
4	Heart-Kidney Non-Interaction	12	4.4%
5	Heart-Spleen Deficiency	4	1.5%
6	Yin Deficiency with Fire Flare-up	2	0.7%

3.3. Frequency statistics of traditional Chinese medicines

The frequency statistics of traditional Chinese medicines showed that 163 types of medicines were used in total,

and 48 types were used with a frequency of ≥ 12 times. The top 10 most frequently used medicines were fried jujube seed, fossil teeth, *Poria cocos*, licorice, *Coptis chinensis*, *Concha margaritifera usta*, processed pinellia tuber, dried tangerine peel, bamboo shavings, and immature bitter orange. The names and specific frequencies of traditional Chinese medicines with a frequency of ≥ 12 are listed in **Table 3**.

Table 3. Frequency statistics table of Chinese herbal medicines (Frequency ≥ 12)

No.	Chinese herbal medicine	Frequency	No.	Chinese herbal medicine	Frequency
1	Fried Semen Ziziphi Spinosae	270	25	Poria	27
2	Dragon Teeth	257	26	Angelica Sinensis	27
3	Poria with Hostwood	239	27	Bupleurum	27
4	Licorice	238	28	Light Wheat	27
5	Coptis Chinensis	173	29	Aucklandia	25
6	Mother-of-Pearl	186	30	Rhizoma Wenyujin Concisa	22
7	Pinellia Ternata (processed)	145	31	Astragalus	22
8	Tangerine Peel	135	32	Scutellaria Baicalensis	22
9	Bamboo Shavings	133	33	Calcined Dragon Bone	21
10	Bitter Orange	129	34	Clematis Root	21
11	Anemarrhena Rhizome	122	35	Magnolia Bark	21
12	Polygala Tenuifolia	121	36	Jujube	21
13	Polygonum Multiflorum Vine	117	37	Amomum Villosum	20
14	Acorus Tatarinowii	86	38	Curcuma Aromatica	19
15	Ligusticum Chuanxiong	73	39	Moutan Bark	18
16	Gastrodia Elata	61	40	Phellodendron Bark	18
17	Vinegar-processed Tortoise Shell	50	41	Calcined Oyster Shell	17
18	American Ginseng	48	42	Ophiopogon Japonicus	15
19	Juncus Effusus	45	43	Honey-fried Licorice	14
20	Lily Bulb	44	44	Fried Gardenia	14
21	Pueraria Lobata	43	45	Forsythia Suspensa	13
22	Rehmannia (raw)	43	46	Albizia Bark	12
23	Platycladus Seed	36	47	Codonopsis Pilosula	12
24	White Peony Root	33	48	Rehmannia (prepared)	12

3.4. Statistical analysis of the four properties of medicines

The statistical analysis of the four properties of the medicines included in the study shows that the Chinese herbal medicines used are mainly cold, neutral, and warm. The four properties, in order of frequency from highest to lowest, are cold medicines (35.42%), neutral medicines (29.65%), warm medicines (29.58%), cool medicines (4.77%), and hot medicines (0.57%). The frequency and percentage of the four properties of the

medicines are shown in **Table 4**.

Table 4. Frequency and percentage statistics of the four properties of medicines

Nature	Frequency	Percentage
Cold	994	35.42%
Neutral	832	29.65%
Warm	830	29.58%
Cool	134	4.77%
Hot	16	0.57%

3.5. Statistical analysis of the five tastes of medicines

The statistical analysis of the five tastes of the medicines included in the study shows that the Chinese medicines used are mainly sweet, bitter, and pungent. The frequency of use from high to low is 37.82% for sweet medicines, 29.18% for bitter medicines, 24.46% for pungent medicines, 5.58% for sour medicines, and 2.98% for salty medicines. The frequency statistics of the five tastes of medicines are shown in **Table 5**.

Table 5. Frequency statistics of the five tastes of medicines

Five flavors	Frequency	Percentage
Sweet	1546	37.82%
Bitter	1192	29.18%
Pungent	1000	24.46%
Sour	228	5.58%
Salty	122	2.98%

3.6. Statistics of drug meridian attribution

The statistical analysis of drug meridian attribution included in the study shows that the Chinese medicinal herbs used are mainly concentrated in the Heart Channel (21.12%), Spleen Channel (17.69%), Lung Channel (16.25%), Stomach Channel (15.29%), and Liver Channel (10.53%), accounting for approximately 80.88% of the total. The remaining drugs attributed to the Kidney, Gallbladder, Large Intestine, Small Intestine, Bladder, Triple Energizer, and Pericardium Channels are less frequently used, accounting for approximately 19.12%. The frequency statistics table of drug meridian attribution is shown in **Table 6**.

Table 6. Frequency statistics table of drug meridian attribution

Meridian Tropism	Frequency	Percentage	Meridian Tropism	Frequency	Percentage
Heart	1728	21.12%	Gallbladder	484	5.92%
Spleen	1447	17.69%	Large Intestine	297	3.63%
Lung	1329	16.25%	Small Intestine	91	1.11%
Stomach	1251	15.29%	Bladder	69	0.84%
Liver	861	10.53%	Sanjiao (Triple Burner)	31	0.38%
Kidney	580	7.09%	Pericardium	12	0.15%

3.7. Statistics on drug effectiveness

Statistical results show that the medications used by Professor Xiong Jibai to treat insomnia are mainly eight categories: heat-clearing drugs, tonifying deficiency drugs, drugs for promoting urination and draining dampness, tranquilizing drugs, Qi-regulating drugs, cough-resolving and phlegm-dispelling drugs, drugs for promoting blood circulation and removing blood stasis, and drugs for calming the liver and suppressing wind. These account for approximately 87.07% of the total medication frequency. The specific drug use frequency is shown in **Table 7**.

Table 7. Statistical table of drug effectiveness frequency

No.	Medicinal category	Frequency	No.	Medicinal category	Frequency
1	Heat-Clearing Medicines	616	11	Dampness-Resolving Medicines	42
2	Tonifying Medicines	541	12	Wind-Damp-Dispelling Medicines	36
3	Dampness-Percolating Diuretics	327	13	Astringent Medicines	15
4	Sedative Medicines	304	14	Interior-Warming Medicines	8
5	Qi-Regulating Medicines	301	15	Purgative Medicines	4
6	Phlegm-Resolving & Antitussives	167	16	Digestant Medicines	4
7	Blood-Activating & Stasis-Resolving	142	17	Heat-Clearing Toxin-Removing	1
8	Liver-Calming & Wind-Extinguishing	138	18	Antiparasitic Medicines	1
9	Exterior-Releasing Medicines	98	19	Hemostatic Medicines	1
10	Orifice-Opening Medicines	86			

4. Discussion

As early as the period of the “Yellow Emperor’s Inner Canon”, traditional Chinese medicine had a certain understanding of insomnia. In the “Yellow Emperor’s Inner Canon”, insomnia is called “eyes not closing”, “unable to sleep”, or “unable to lie down”, and its mechanism is analyzed in detail, mainly attributed to the imbalance of yin and yang, disharmony of nutritive qi and defensive qi, and disharmony of spleen and stomach. It also proposes the use of Banxia Shumi decoction for treatment. By the Tang and Sui Dynasties, the “Treatise on the Origins and Manifestations of Various Diseases” summarized the three major causes of insomnia, namely “defensive qi flowing alone in yang meridians”, “heat in the heart”, and “cold in the gallbladder.” Sun Simiao’s

“Qian Jin Yi Fang” records the use of the Wendan decoction to treat “restlessness and insomnia after a serious illness.” “Wu Yi Hui Jiang: Daily Miscellaneous Notes” also has a similar view: “Although dreams are related to the yin and yang of the organs, they are mainly related to the heart and liver. Why? Because there is no case where the soul is calm but the dreams are disturbed.” The “Jing Yue Quan Shu” states, “Drinking strong tea leads to insomnia.” “Strong tea, with its yin and cold nature, greatly restrains yang. When yang is suppressed by yin, the spirit becomes restless, leading to insomnia.” This shows that doctors throughout history have had a systematic understanding of the etiology, pathogenesis, and treatment of insomnia.

Professor Xiong Jibai believes that the core pathogenesis of insomnia lies in the malnutrition or restlessness of the mind and spirit, which also involves the disharmony of the liver, gallbladder, spleen, stomach, kidney, and other organs, as well as qi and blood, and yin and yang. Therefore, Professor Xiong considers that the key points of syndrome differentiation for insomnia include identifying the disease location and distinguishing between deficiency and excess syndromes. The disease locations mainly involve the heart, spleen, liver, stomach, gallbladder, and other organs. In terms of deficiency and excess syndromes, deficiency syndromes are often caused by yin deficiency and blood deficiency, leading to malnutrition of the mind and spirit, or deficiency of heart and gallbladder qi, resulting in easy awakening from fright and unrestful sleep. Excess syndromes are mostly caused by excessive heat in the heart and liver, disturbing the mind and spirit, or may be combined with turbid phlegm to form a syndrome of phlegm-heat disturbing the spirit. From the syndrome differentiation patterns in this study, the syndrome of phlegm-heat internal disturbance is the most common type of insomnia in clinical practice. Common symptoms include insomnia accompanied by symptoms of phlegm-heat internal accumulation, such as restlessness, chest tightness, excessive phlegm, and heavy head. The typical tongue and pulse manifestations are red tongue, yellow and greasy tongue coating, and slippery and rapid pulse. The empirical formula for treating insomnia caused by phlegm-heat internal disturbance is Huanglian Wendan Decoction. Wendan Decoction, originating from “Three Causes and Treatments”, can regulate qi, resolve phlegm, clear the gallbladder, and harmonize the stomach. It is mainly used to treat insomnia caused by gallbladder and stomach disharmony. Professor Xiong often replaces Fuling (*Poria cocos*) with Fushen (*Poria* with Hostwood) in clinical practice, adds Huanglian (*Coptis chinensis*), which is bitter and cold to clear heat and dry dampness, and Huanglian also enters the heart meridian to clear heart fire and enhance the therapeutic effect. In this study, the syndrome of deficiency of heart and gallbladder qi accounts for the second-highest proportion of insomnia cases. Professor Xiong’s empirical formula for treating this syndrome is Kongsheng Zhenzhong Pill combined with Suanzaoren Decoction.

5. Conclusion

Professor Xiong Jibai’s clinical experience suggests that insomnia is primarily rooted in dysfunction of the heart and spleen, with key pathological factors being phlegm, fire, and deficiency. His treatment strategy emphasizes regulating cold-heat balance and tonifying deficiency while purging excess, combined with sedative and tranquilizing herbs to enhance therapeutic efficacy. This approach reflects the TCM principle of personalized syndrome differentiation and holistic regulation, providing valuable insights for the clinical management of insomnia. Further research is warranted to validate and refine these treatment protocols.

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Disclosure statement

The authors declare no conflict of interest.

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