

Original Article

Analysis of Koryo medicine research: clinical medicine topics in *Koryo medicine*

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Objectives: South Korea, the United States, and the United Nations have imposed extensive economic sanctions against North Korea, which increased the use of traditional Korean medicine in North Korea to maintain its national health care system. This study attempts to study the latest trends of traditional Korean medicine research through bibliographic analysis of one of the North Korean medical journals. It will then provide insights into how traditional Korean medicine is used in North Korea.

Methods: This study is based on 611 clinical research articles out of 931 articles extracted from 13 volumes of *Koryo Medicine* (2016 ~ 2019). The articles were classified according to the researched treatment, diseases and use alongside conventional drugs.

Results: Based on the analysis of *Koryo Medicine*, the proportion of clinical research articles investigating the treatment effects was very high (65.6%). Also, clinical research using herbal medicine as treatment was the most common, accounting for 17.69% of the total. Some of the clinical research in *Koryo Medicine* were conducted in tandem with conventional drug treatment, especially on acupuncture.

Conclusion: This study conducted a bibliographic analysis of *Koryo Medicine* to understand the current status of traditional Korean medicine within North Korea. The analysis identified main diseases, treatment methods, and integration with conventional drugs in the clinical research of traditional Korean medicine. As a country actively seeking to use traditional Korean medicine, North Korea will become an interesting field of global traditional medicine and complementary medicine research.

Key Words : North Korea, Koryo Medicine, Research trend, Clinical research, Bibliographic analysis

Introduction

The main treatment methods of traditional Korean medicine includes acupuncture, moxibustion, cupping, herbal medicine and manual therapy.¹⁾ North and South Korea share the same traditional Korean medicine system, which is very similar to traditional medicine being practiced in China and Japan. The name of traditional Korean medicine

in North Korea is “Koryo Medicine,” deriving from the ancient dynasty “Koryo”, which is also where the country name “Korea“ originates from. North Korea changed the name to Koryo medicine in 1993 to emphasize the regime’s governing ideology, “Juche”, which seeks to indoctrinate self-reliance within the nation.²⁾

South Korea, the United States, and the United Nations have currently imposed extensive

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economic sanctions against North Korea. These sanctions made supplying products or conducting economic activities became difficult within North Korea.³⁾ The difficulty of purchasing imported medicines and medical supplies meant North Korea had to increase the use of Koryo medicine to maintain its national health care system.⁴⁾ This is also in line with the economic policies of the Kim Jong Un regime, characterized by “localization policy” which encourages the consumption of locally produced or sourced products.⁵⁾ Koryo medicine in North Korea accounts for 30-40% at the largest hospital-level treatments, 40-60% at the local level, and 70% at primary care.⁶⁾ In primary medical services, Koryo medicine is provided alongside conventional drugs with the majority consisting of traditional therapies such as acupuncture and moxibustion, but also covers internal and surgical diseases.⁷⁾ Koryo medicine research in North Korea is conducted by the Koryo Medical Research Institute (KMRI) under the Ministry of Health. Besides KMRI, institutions that conduct traditional medical research in North Korea are the Institute of Pharmacology and Natural Material under KMRI, the Koryo Pharmaceutical Technology Center, traditional Korean medicine departments of all medical schools, Special Hospital for Koryo Medicine, and other various medical institutions.⁷⁾

Despite its importance in North Korea, there is very little information on Koryo medicine, especially after the collapse of inter-Korean relations when all forms of exchange with North Korea ceased. Due to the difficulty of acquiring information, bibliographic analysis of North Korean academic journals can be used to analyze

North Korean society and its characteristics.⁸⁾

While North Korean medical journals have been analyzed in the field of internal medicine⁸⁾, dentistry^{9,10)}, pharmaceutical¹¹⁾, and oncology¹²⁾, the Koryo medicine has never been analyzed using North Korean journals. However, identifying North Korea’s research trend is challenging due to the lack of accessible research data. Nevertheless, North Korea’s clinical research trends in using Koryo medicine can be identified through publications such as *Rodong Sinmun* or *Koryo Medicine*. This paper seeks to examine the types and trends of clinical research being conducted in North Korea using Koryo medicine to identify which disease and treatment is considered significant in North Korea.

Materials and Methods

1. Data

This study uses data contained in the academic journal, *Koryo Medicine*, published in North Korea. Although newspapers such as *Rodong Sinmun* can be used to analyze research trends, understanding research trends and methodology requires standardization of analysis. Hence, this paper seeks to analyze *Koryo Medicine*, the only academic journal on traditional medicine published in North Korea, to identify research trends.

Koryo Medicine has been published by the Medical Science Press, containing 187 volumes as of 2019. The number of Volumes per year differs as well as the number of articles within a single Volume. For example, 70 articles were published in Volume I of 2019. The article types

included in *Koryo Medicine* are original articles and review articles. Aside from the scientific literature, the journal contains two prefaces, each containing political propaganda.

Koryo Medicine can be accessed at the “North Korean Resource Center” of the National Library of Korea. The journals were collected through the “North Korean Data Center” which is operated by the Ministry of Unification. The data source is 931 articles in *Koryo Medicine* which is equivalent to 13 volumes from 2016 to 2019. Data range was selected as the oldest publication of *Koryo Medicine* found in “North Korean Data Center” was from 2016, with the most current published in 2019.

This study used data from 611 articles on clinical research. This paper classified all literature within the journal dealing with humans as clinical research. This study used only data from clinical research since *Koryo Medicine* does not clearly define research methods making it difficult to distinguish methods between studies. As such, this study analyzed the clinical research literature as they were the most active research methods.

2. Analysis

The articles on clinical research were classified into treatment methods, target diseases, and combinations with conventional drugs. Specific research methods were difficult to determine since the articles did not mention them. Thus, this study first extracted 19 treatment methods that were covered the most throughout all the articles. These 19 treatment methods were then divided into non-pharmacological methods, pharmacological

methods, and diagnosis. Non-pharmacological methods were divided into 14 categories which are acupuncture, intradermal acupuncture, auricular acupuncture, fire needling acupuncture, other types of acupuncture, moxibustion, acupuncture device, and moxibustion, cupping, venesection, manipulative therapy, needle-embedding therapy, other methods, Sasang constitutional medicine and unknown. Since there was little literature on diagnosis, all articles related to diagnosis were included in the analysis. Pharmacological methods were divided into four categories: herbal medicine/herbal extract granules, pharmacopuncture, other *Koryo medicine*, and unknown. Since articles on Sasang constitutional medicine included both treatment methods and diagnosis, Sasang constitutional medicine is classified under non-pharmacological methods.

Second, the articles were classified according to the researched diseases. The diseases were classified according to the 22 main categories of the Korean Standard Classification of Diseases 7th Revision(KCD-7 version). However, the diseases in the articles did not meet the KCD-7 standard as it was expressed in vernacular or in North Korean. Two Korean Medicine doctors participating in this study classified the diseases according to the KCD-7, and conducted cross-examination to ensure that the classification was valid. Diseases that were difficult to distinguish using the information provided in the articles were classified as “unknown”.

Finally, the articles were classified according to their use alongside conventional drugs to examine the interaction between *Koryo medicine* and conventional medicine practice in North Korea.

Articles determined to have integrated conventional drugs with Koryo medicine treatment have been reclassified according to the treatment methods and target diseases. Integrated treatment is defined as the use of conventional drugs, injection of conventional drugs, and surgery with traditional medical treatment methods.

Results

1. Classification of clinical research articles by treatment methods

The Table 2 shows the classification of the total articles by treatment methods: non-pharmacological method, pharmacological method, and diagnosis. The most frequently implemented non-pharmacological methods were body acupuncture (15.48%), acupuncture device and moxibustion (8.15%), and other therapies (6.75%). Here, other therapies include the use of hot spring baths, application of medicine using towels, and simple incisions.

Frequently used pharmacological methods were herbal medicine (17.69%), pharmacopuncture (12.69%), and diagnosis (0.12%).

2. Clinical research articles by disease

624 clinical research articles were classified as target diseases based on 22 main categories of the 7th Korean Standard Classification of Diseases (KCD). In some cases, one article contained two or more diseases, in which case the items were classified as duplicates. The clinical research articles on digestive system diseases (K00-K93) are the most frequent, with a total of 132 articles. Secondly, musculoskeletal system and connective tissue diseases (M00-M99) accounted for the largest proportion, with 107 articles. There were 63 articles on genitourinary system diseases (N00-N99) and 52 articles on circulatory system diseases (I00-I99).

Table 1. Literature Analysis of *Koryo Medicine*

Year	Volume	Total Article (n)	Clinical Research Article (n)	%
2016	1	66	39	59.1
	2	70	53	75.7
	3	72	42	58.3
	4	74	45	60.8
2017	1	69	52	75.4
	2	65	37	56.9
	3	80	49	61.3
	4	73	53	72.6
2018	1	72	44	61.1
	2	78	53	67.9
	3	73	48	65.8
	4	72	49	68.1
2019	1	67	47	70.1
Total		931	611	65.6

3. Clinical research articles on major disease treatment method

The treatment methods used in the clinical research articles consisted of the analysis of four main diseases. First, in the clinical research articles on digestive system diseases (K00-K93), herbal medicine was used as the most frequent treatment method (58 articles), followed by acupuncture (28 articles), other Koryo medicine such as the use of hot spring baths, application of medicine using towels, and simple incisions (17 articles), and pharmacopuncture (13 articles).

The most common therapies for musculoskeletal and connective tissue diseases(M00-M99) were manual therapy (36 articles), followed by pharmacopuncture (28 articles), and acupuncture

devices and moxibustion (22 articles).

Diseases of the genitourinary system (N00-N99) were the third most common diseases with the most frequent method being acupuncture (19 articles), followed by herbal medicine (18 articles).

Finally, the most frequent treatment methods involved in circulatory system diseases (I00-I99) are herbal medicine(16 articles), followed by acupuncture device and moxibustion (9 articles) and pharmacopuncture (9 articles).

4. Clinical research articles containing the integration of conventional drugs

There were a total of 150 clinical articles

Table 2. Classification of Therapy Types in Clinical Research Literature

Intervention Method		n	%
Non-pharmacological Method	Common Acupuncture	133	15.48
	Intradermal Acupuncture	5	0.58
	Auricular acupuncture	23	2.68
	Warm needling acupuncture, Fire needling acupuncture	20	2.33
	Other types of acupuncture	8	0.93
	Moxibustion	38	4.42
	Acupuncture device and/or Moxibustion	70	8.15
	Cupping	34	3.96
	Venesection(blood-letting)	16	1.86
	Manipulative therapy	51	5.94
	Needle-embedding Therapy	14	1.63
	Other Methods	58	6.75
	Sasang Constitutional Medicine	8	0.93
	Total	478	55.65
Pharmacological Method	Herbal medicine /Herbal Extract granules	152	17.69
	Pharmacopuncture	109	12.69
	Other Traditional Korean Medicine	82	9.55
	Total	343	39.93
	Diagnosis	1	0.12
	Unknown	37	4.30
	Total	859	100.0

containing the integration of conventional drug treatment. The most common clinical research was on herbal acupuncture (61 articles), followed by herbal medicine (20 articles) and acupuncture (18 articles). Herbal medicine, acupuncture, and pharmacopuncture were the most frequently used treatment methods in the entire clinical research articles. However, pharmacopuncture was the most frequent method with 40.67% in clinical research articles related to the integration of conventional drug treatment.^{13,14,15)}

When classifying the articles related to conventional drug^{13,14,15)} treatment integration according to the KCD standards, the most

frequent categories were digestive system diseases (K00-K93) (23 articles), musculoskeletal diseases and connective tissue (M00-M99) (14 articles), and respiratory system diseases (J00-J99) (12 articles). Acupuncture was often used in respiratory diseases in the total clinical research treatment methods but also combined with conventional drug^{13,14,15)} treatment.

Discussion

This study conducted frequency analysis of *Koryo Medicine* articles to show the research trends and use of Koryo medicine in North

Table 3. Classification of Clinical Research Literature According to KCD Standards

KCD Classification	Articles (n)	%
Diseases of the digestive system (K00-K93)	132	21.15
Diseases of the musculoskeletal system and connective tissue (M00-M99)	107	17.15
Diseases of the genitourinary system (N00-N99)	63	10.1
Diseases of the circulatory system (I00-I99)	52	8.33
Diseases of the nervous system (G00-G99)	34	5.45
Diseases of the skin and subcutaneous tissue(L00-L99)	33	5.29
Diseases of the respiratory system (J00-J99)	31	4.97
Endocrine, nutritional and metabolic diseases (E00-E90)	27	4.33
Mental and behavioural disorders (F00-F99)	21	3.37
Symptoms, signs and abnormal clinical and laboratory findings, NEC (R00-R99)	18	2.88
Certain infectious and parasitic diseases (A00-B99)	17	2.72
Unknown	17	2.72
Injury, poisoning and certain other consequences of external causes (S00-T98)	14	2.24
Pregnancy, childbirth and the puerperium (O00-O99)	13	2.08
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	11	1.76
Diseases of the eye and adnexa (H00-H59)	11	1.76
Neoplastic disease (C00-D48)	8	1.28
Other	7	1.12
Diseases of the ear and mastoid process (H60-H95)	6	0.96
Codes for special purposes (U00-U99)	1	0.16
Factors influencing health status and contact with health services (Z00-Z99)	1	0.16
Total	624	100.0

Table 4. Clinical Research Literature on the Treatment Methods of Key Injuries/Diseases

Frequency	K00-K93		M00-M99		N00-N99		I00-I99	
	Treatment Method	n (%)	Treatment Method	n (%)	Treatment Method	n (%)	Treatment Method	n (%)
1	Herbal medicine/Herbal Extract granules	58(32.4)	Manipulative therapy	36(20.6)	Acupuncture	19(21.6)	Herbal medicine /Herbal Extract granules	16(22.9)
2	Acupuncture	28(15.6)	Pharmacopuncture	28(16.0)	Herbal medicine/Herbal Extract granules	18(20.5)	Device, acupuncture, moxibustion	9(12.9)
3	Other traditional Korean medicine	17(9.5)	Device, acupuncture, moxibustion	22(12.6)	Other traditional Korean Medicine	10(11.4)	Pharmacopuncture	9(12.9)
4	Pharmacopuncture	13(7.3)	Acupuncture	15(8.6)	Other Methods	7(8.0)	Acupuncture	8(11.4)
5	Device, acupuncture, moxibustion	12(6.7)	Other Methods	15(8.6)	Warm needling acupuncture, Fire needling acupuncture	6(6.8)	Other Methods	5(7.1)
6	Moxibustion	9(5.0)	Other traditional Korean medicine	15(8.6)	Moxibustion	5(5.7)	Other traditional Korean medicine Korean Medicine	5(7.1)
7	Cupping	8(4.5)	Cupping	10(5.7)	Device, acupuncture, moxibustion	5(5.7)	Auricular acupuncture	4(5.7)
8	Other Methods	6(3.4)	Warm needling acupuncture, Fire needling acupuncture	6(3.4)	Pharmacopuncture	5(5.7)	Cupping	3(4.3)
9	Unknown	6(3.4)	Moxibustion	6(3.4)	Cupping	3(3.4)	Manipulative therapy	3(4.3)
10	Warm needling acupuncture, Fire needling acupuncture	5(2.8)	Herbal medicine /Herbal Extract granules	6(3.4)	Unknown	3(3.4)	Unknown	3(4.3)

Korea. This study is significant as it identified North Korea's clinical research trends on traditional medicine using *Koryo Medicine*. This

study provides insight on the utilization of Koryo medicine thru the bibliographic analysis of *Koryo Medicine*.

Table 5. Classification of Clinical Research Literature on Conventional Drug Integration based on Treatment Methods

Intervention Method	n	%
Pharmacopuncture	61	40.67
Herbal medicine /Herbal Extract granules	20	13.33
Acupuncture	18	12.00
Other traditional Korean medicine	11	7.33
Other Methods	10	6.67
Moxibustion	6	4.00
Acupuncture device, Moxibustion	6	4.00
manipulative therapy	5	3.33
Auricular acupuncture	4	2.67
Warm needling acupuncture, Fire needling acupuncture	3	2.00
Cupping	3	2.00
Intradermal Acupuncture	1	0.67
Venesection(blood-letting)	1	0.67
Unknown	1	0.67
Total	150	100.0

Table 6. KCD Classification of Clinical Research Literature on Conventional Drug Integration

KCD Classification	n	%
Diseases of the digestive system (K00-K93)	23	21.5
Diseases of the musculoskeletal system and connective tissue (M00-M99)	14	13.08
Diseases of the respiratory system (J00-J99)	12	11.21
Diseases of the nervous system (G00-G99)	10	9.35
Diseases of the circulatory system (I00-I99)	8	7.48
Diseases of the skin and subcutaneous tissue (L00-L99)	8	7.48
Certain infectious and parasitic diseases (A00-B99)	6	5.61
Diseases of the genitourinary system (N00-N99)	6	5.61
Diseases of the eye and adnexa (H00-H59)	4	3.74
Diseases of the ear and mastoid process (H60-H95)	3	2.8
Injury, poisoning and certain other consequences of external causes (S00-T98)	3	2.8
Others	3	2.8
Neoplastic disease (C00-D48)	2	1.87
Symptoms, signs and abnormal clinical and laboratory findings, NEC (R00-R99)	2	1.87
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	1	0.93
Endocrine, nutritional and metabolic diseases (E00-E90)	1	0.93
Mental and behavioral disorders (F00-F99)	1	0.93
Total	107	100.0

In *Koryo Medicine*, clinical research on determining the effect of treatment was very frequent (65.6%). Other than clinical research, most of the research was basic research, such as in vitro and in vivo research on the effects of traditional North Korean medicine. Although research on classical medical literatures is an important part of traditional medical research in East Asian countries, it was difficult to find such research within *Koryo Medicine*. However, because the analysis only used articles from *Koryo Medicine*, it does not cover all the research related to traditional North Korean medicine, so it is difficult to draw a conclusive explanation on why old document research is scarce in North Korea.

Among clinical research articles, research using herbal medicine was most common, accounting for 17.69% of the total. Herbal medicine, along with acupuncture, moxibustion, and cupping, is one of the most commonly used traditional medical treatments. However, the active clinical research on herbal medicine seems to be affected by North Korea's domestic situation. North Korea Economic sanctions imposed on North Korea make it difficult for Western medicine to be accessible and affordable, which is why Koryo medicine is used as a replacement for Western medicine⁶⁾. Due to the increased importance of herbal medicine/preparation, North Korea enacted the “Herbal Medicine Law”, which emphasized the preservation and production of herbal resources (“Herbal Medicine Law”). *Rodong Sinmun*, the official newspaper for the Worker’s Party of Korea, frequently promotes the production of Koryo medicine production institute

and its performance. Also, research on herbal medicine/preparations has become more active as a means to achieve ‘independent economy’ which is an important characteristic of the Kim Jung-Un regime.

In *Koryo Medicine*, the number of clinical research involving “musculoskeletal and connective tissue diseases” is not high, accounting for only 17.15%. In South Korea, however, the proportion of clinical research on “musculoskeletal and connective tissue diseases” is high, accounting for half of the 10 most commonly treated diseases in Korean medical services (Health Insurance Review and Assessment Service, 2018). This is because traditional Korean medical services in South Korea are mainly provided through acupuncture, so the proportion of musculoskeletal disease treatment, which is widely known to be treated with acupuncture, has increased. This has led to an increase in the clinical research of using acupuncture and the treatment of musculoskeletal diseases using Koryo medicine. In contrast, Koryo medicine research in North Korea does not focus on musculoskeletal diseases but focuses on internal diseases such as digestive system diseases, genitourinary system diseases, and circulatory system diseases. This was also shown in the results of this study in the frequency of Koryo medicine treatment by disease type.

In 2016, diseases with the highest DALY (Disability Adjusted Life Year) in North Korea were stroke, ischemic heart disease, chronic obstructive pulmonary disease, trachea-bronchus-lung cancers, and tuberculosis (WHO). However, in traditional medicine literature, the most researched diseases were related to the ‘digestive

system.’ The specific disease mentioned in the literature included gastritis, gastric ulcer, colitis, and irritable bowel syndrome. This indicates that North Korea uses traditional medicine to provide primary medical care. However, further research is required to identify why ‘digestive system diseases’ in particular are so prevalent in existing literature.

There is a wealth of clinical Koryo medicine research conducted in tandem with conventional drugs, especially in acupuncture. There were many clinical research that combined Western medical treatments, especially herbal acupuncture studies. In North Korea, traditional medicine is generally used in tandem with Western medicine in order to enhance the effect, or decrease adverse effects of Western medicine¹⁶). The simultaneous use of traditional and Western medicine is because North Korea's healthcare system, like China, does not differentiate the scope of licensed practices between Western and traditional medical doctors. Hence, there is no regulatory barriers on an institutional level hindering the addition of both Western and traditional medicinal ingredients to herbal acupuncture.

This study has the following limitations. First, due to the lack of a North Korean research literature search engine, only *Koryo Medicine* was used as the data source to represent traditional North Korean medicine journals.

Since this study analyzed only the *Koryo Medicine*, it lacks analysis of additional journals that contain traditional medicine as well as other traditional medicine research that has not been published. For example, other traditional North Korean medical journals such as *Chosun*

Medicine, *Chosun Pharmacy*, *Preventative Medicine* all contain Koryo medicine research, but these were not analyzed in this study. Yet, the analysis indicates that although traditional medicine is gaining importance in North Korea, its primary function seems to be limited to chronic and mild disease treatment. This is similar to how traditional medicine is applied in East Asian countries such as China, Japan, Taiwan, etc. Secondly, the types of research conducted in *Koryo Medicine* differs from research in South Korea. For example, typical research topics in South Korea such as historical research, discovery, and interpretation of old documents, and social research related to Koryo medicine are not dealt with as often as clinical research and basic research in North Korea. Third, two Koryo medicine doctors classified disease written in North Korean vernacular language by its disease and treatment method according to KCD classification, but this method of the included articles did not provide enough details. Since Korean and North Korean language is different, some diseases might have been incorrectly classified. Finally, due to the lack of information on the external situation in North Korea, it was difficult to review the results of the study. Despite these limitations, this study could provide a deeper understanding of the current traditional medicine research trend in North Korea by analyzing one of the Korean medical journals focused on traditional North Korean medicine.

Conclusion

This research conducted a bibliographic analysis of *Koryo Medicine* original and reviewed articles to identify the current trend of traditional North Korean medicine. The original articles were comprised of an introduction, research topics and methods, research results, conclusions, and references were generally about 1-2 pages long with 1-2 authors. Analysis of this data identified the main diseases, treatment methods, and integration with conventional drugs^{13,14,15} within the clinical research field of North Korea. It also presented Koryo medicine research and its use in North Korea. As a country actively using Koryo medicine, the study of *Koryo Medicine* in North Korea will become an interesting field of global traditional medicine and complementary medicine research.

Author Disclosure Statement

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