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## Review Article

# Perception, attitude, and demand for Korean medicine and Western medicine collaborative treatment of medical occupational groups in Korea: A scoping review

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## ABSTRACT

**Background:** In Korea, there exists a dual medical license system whereby both traditional Korean medicine and Western medicine doctors practice independently. In 2009, via medical law revision, cross employment was allowed to activate Korean medicine and Western medicine collaborative treatment (KWCT). Despite its several advantages, there are several barriers to a well-organized KWCT. To activate KWCT, we investigated perception, attitude, demand of medical occupational groups and research gap via scoping review.

**Methods:** Scoping review is an emerging methodology for knowledge synthesis adopting the Arksey and O'Malley framework. The research question was "What is known about perception, attitude, demand, and research gap on KWCT?" We searched articles published from 2009 to 2019 in 7 Korean and 4 English databases. We conducted descriptive and qualitative thematic analysis and presented the research gap. **Results:** From 1305 articles, 6 quantitative and 3 qualitative studies were included. In quantitative studies, perception and attitude of medical occupational groups did not change markedly. For better perception and attitude, experiencing, mutual understanding, and respect should precede. Academic exchange, education, supporting KWCT research and legal/institutional/administrative support is also important. In qualitative studies, education course, guidelines, trust, safety, academic integration, and scientification were also required. We found several research gaps about KWCT especially detailed on-site demand and activation strategy about KWCT.

**Conclusion:** We investigated perception, attitude, and demand on KWCT. Based on research gap in our scoping review, quantitative studies using validated questionnaire and in-depth interview are needed to identify on-site demand to improve KWCT implementation.

**Protocol registration:** <https://www.researchregistry.com/> (reviewregistry830).

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## 1. Introduction

Korean medicine (KM) represents Traditional East Asian Medicine (TEAM) and has changed and developed with Traditional Chinese Medicine through thousands of years of history.<sup>1</sup> TEAM is still widely used by its own people in East Asia; however, there are some differences in license type and health insurance system, etc. according to the national medical system.<sup>2,3</sup> In Korea, Western medicine (WM) was introduced in the 19th century and became part of mainstream medicine. However, after enactment of the Medical Law in 1951, the Korean and Western medicine

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doctor licenses coexisted independently in the form of medical dualization.<sup>4</sup>

“Korean medicine and Western medicine collaborative treatment (KWCT)” is defined as the medical treatment of patients by cooperating with Western medicine doctors (WMDs) and Korean medicine doctors (KMDs) based on their medical theories and technology.<sup>5</sup> Since the first KWCT center in Korea was established at Kyunghee Medical Center in 1971, the number of KWCT hospitals has increased.<sup>6</sup> Recently, the efforts of the KWCT have increased due to the demand for new medical care and various socioeconomic factors such as low fertility, population aging, and increase in prevalence of chronic degenerative diseases.<sup>7</sup> Therefore, in January 2009, the government allowed the advanced cooperation system that cross employed other types of licensed medical doctors at the same medical institutions above hospital level under Article 43 of the Medical Law (for instance, WMDs are hired in KM hospital, vice versa), to promote the convenience of use of facilities among patients and strengthen medical competitiveness. Article 43 (Specialized Department, etc.) was amended in 2009, and it was implemented in 2010.<sup>8</sup> In addition, for the smooth institutional implementation of KWCT, the Ministry of Health and Welfare started the KWCT pilot project. In the first stage pilot project in 2016 and 2017, the government tried to confirm the possible form of KWCT and identify high-prevalence diseases for KWCT. In the second stage pilot project, the government focused on evaluating the effectiveness of the KWCT, adjusting the medical fee for the KWCT, and establishing the certification criteria and grade for certified KWCT hospitals.<sup>9</sup>

Studies on KWCT have been conducted steadily since the 1990s, and the most frequently published article type in this regard were case reports.<sup>10</sup> In addition, various studies have been conducted about the effectiveness of KWCT,<sup>11–13</sup> surveys on perception and satisfaction on the KWCT,<sup>14–16</sup> survey about the actual condition and status of the KWCT,<sup>17</sup> development of the KWCT system,<sup>18</sup> KWCT manual development,<sup>19</sup> and economic evaluation of KWCT.<sup>20</sup> Based on these studies, literature reviews have also been published such as regarding the effect of KWCT on musculoskeletal diseases,<sup>21</sup> combination drug treatment in KWCT,<sup>22</sup> and a research trend analysis on KWCT.<sup>10</sup> However, in 2009, when cross-employment of other types of licensed medical doctors were allowed at the same hospital (Article 43 of the Medical Law), the KWCT system in Korea came to a fundamental turning point. Although some suggestions were made based on a literature review published before 2009<sup>23</sup> about activation strategies to overcome barriers of KWCT, it is not suitable at the present time when the KWCT system has changed fundamentally through cross-employment of medical doctors with different licenses. In addition, in the literature review,<sup>23</sup> only quantitative studies were reviewed; however, qualitative research should be included for in-depth understanding.

There has been gradual improvement in terms of medical systems and laws about KWCT, but confrontation between WMDs and KMDs is still severe and cooperation is not done well.<sup>24</sup> Thus, it is necessary to identify how practitioners of KWCT cope with the obstacles of KWCT, what strategies they apply to activate/improve KWCT in the new medical environment after 2009, and what achievements and tasks are left to accomplish. For these purposes, a scoping review was performed to systematically map the KWCT related research published since 2009 and assess the research gap. Specifically, the primary objective was to organize the perception, attitude, and demand of medical workers and university students regarding KWCT. The secondary objective was to examine the studied aspects and gaps by mapping studies on KWCT. The last objective was to suggest what kind of research should be conducted on KWCT through this review. Therefore, the present study reviewed both quantitative and qualitative studies conducted in

this area, published after 2009. These results will be used as fundamental data for future quantitative and qualitative research.

## 2. Methods

The scoping review is an emerging methodology for knowledge synthesis,<sup>25</sup> which documents what has been studied and critically analyzes the gaps in research to refine research questions, concepts and theories, and suggest future research directions.<sup>26,27</sup> According to Colquhoun et al. (2014), “a scoping review is a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge.”<sup>25</sup> In the present study, a scoping review method was used, a flexible yet comprehensive approach, which is preferred as an approach to these topics due to the uncertain amount of existing literature on the perception, attitude and demand for KWCT.<sup>28</sup> Each of the five proposed steps for scoping review was covered by using an established protocol based on the ‘Arksey and O’Malley framework’.<sup>29,30</sup> We reported our scoping review according to the PRISMA extension for scoping reviews checklist.<sup>31</sup>

### 2.1. Step 1: identifying the research question

As described in the introduction section, JL, IY, and MJ agreed to focus on the perception, attitude and demand for KWCT. The research question for this scoping review was as follows: What is known about the perception, attitude, and demand on KWCT? What is the research gap regarding further qualitative and quantitative studies for advancing stratagem for KWCT?

### 2.2. Step 2: identifying relevant studies

Seven Korean electronic databases – Korea Citation Index (KCI), Korean studies Information Service System (KISS), Research Information Service System (RISS), Oriental Medicine Advanced Searching Integrated System (OASIS), DBPIA, National Digital Science Library (NDSL), KOREAMED, and Research Information Service System Thesis (RISS Thesis) and four English databases – Medline (via PUBMED), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched in July 2019, restricted to articles published in the past decade (i.e., between 2009 and 2019). As described in the introduction section, we limited our review to articles published since 2009 because the paradigm of KWCT has changed fundamentally through the revision of the Medical Law in 2009. Even though there were no published articles about the consequences of the revision of the law, mutual employment made critical changes such as more communication and understanding, consultation and referring, and medical examination and combination therapy by both KMDs and WMDs. It also promotes the establishment of traditional Korean medicine hospitals for 10 years because employment of Western medicine doctors creates additional medical profit generated by performing medical examinations, injection therapy, physical therapy, and so on. It is the reason why we restricted the range of the literature review. In the Korean databases, search terms included “hyup-jin (Korean word for collaborative treatment)”, “collaborative treatment”, or “collaborative medicine”. In English databases, “Korea” was added.

### 2.3. Step 3: study selection

#### 2.3.1. Inclusion criteria

We selected articles regarding KWCT in this study. Among them, we limited our review to those regarding the perception, attitude, and demands of medical workers (WMDs, KMDs, and nurses) and

medical students about KWCT. The demands included obstacles or limitations of KWCT, and suggestions for improving KWCT in the future. Both qualitative and quantitative studies were included since the research methodology was not limited.

### 2.3.2. Exclusion criteria

First, papers about collaborative treatment in foreign countries were excluded because this paper was about domestic collaborative treatment in Korea. Articles about the following research topics were excluded: case reports, guidelines, guidelines development process, protocols and system development of KWCT, economic evaluation or efficacy studies of KWCT, cross-sectional quantitative reporting of KWCT status, and development of KWCT education system. Despite mailing the corresponding author, articles with unavailable full text were also excluded.

### 2.3.3. Screening and agreement

Study selection was performed in two phases. In phase 1, the papers were excluded based on titles and abstracts. In phase 2, the full texts were downloaded and examined, and excluded when they did not meet the eligibility criteria. Fig. 1 shows a summary of the inclusion/exclusion process in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram.<sup>32</sup> Two reviewers (JL and IY) selected articles independently and compared the search results. Disagreements were resolved by a third researcher (MC). We conducted pilot screening.

## 2.4. Step 4: charting the data

Basic information was extracted on a pre-defined data charting form from selected papers using Excel 2016 (Microsoft Corporation, Redmond, WA, USA). We conducted pilot data extraction. Data charting was done by two reviewers (JL and IY) separately and an agreement was reached when there were inconsistencies. We recorded data including the author, year of publication, period of research, subjects, characteristics of the subjects (age, gender, etc.), sample size, response rate, data collection method, sampling method, method of research, analysis method, research institute, and the perception, attitude, and demand toward KWCT. In addition, each item of the Consolidated Criteria for Reporting Qualitative Research (COREQ)<sup>33</sup> and Critical Appraisal Skills Programme (CASP)<sup>34</sup> were extracted for qualitative evaluation of the qualitative research papers. For qualitative synthesis of these, themes and categories mentioned in each qualitative study and representative in vivo codes were also extracted.

## 2.5. Step 5: collecting, summarizing and reporting the results

### 2.5.1. Data analysis

- Descriptive numerical analysis:** In quantitative studies, the research theme, research design, the number and characteristics of participants, and the response rate were presented, as were the perception, attitude and demand for KWCT. In qualitative studies, the research subjects, research methods, and interviewees were described.
- Qualitative thematic analysis:** In quantitative studies, results were thematically described according to the main theme of the research (perception, attitude, and demand). These categories (perception, attitude, and demand) are sometimes used in quantitative and qualitative studies involving the medical occupational group as a consumer to explore the medical system and medical service.<sup>35–37</sup> In addition, we did not assess cognition, behavior, and affect in this study as information about these categories was not obtained via the preliminary data extraction. As a validated instrument for assessing perception, attitude, and

demand for KWCT was not yet developed, we could not provide an exact definition. Therefore, through consensus among the researchers, (1) perception was defined as usual thought about KWCT such as basic knowledge, experience, satisfaction, advantages, and barriers; (2) attitude was defined as the reaction to KWCT, the usual thoughts about KWCT, and the intention to recommend KWCT; and (3) demand was defined as requirements to improve KWCT such as legal support, administrative support, educational support, and research support.

In qualitative studies, the themes, categories and representative in vivo coding presented in each study were extracted and an overview of each qualitative research was provided. A full qualitative thematic analysis was performed on the discussion sections.

- Reporting the findings and producing the study outcome:** We identified all topics surveyed in each research and conducted a comprehensive analysis. We presented a research map table and assessed which topics were surveyed in each research. We could visualize which topics were explored or not through the map. With the table, we also assessed whether topics on quantitative research were also mentioned in qualitative studies. This map was created to identify research gaps.

## 2.6. Additional step: quality assessment

The quality of the survey (quantitative) studies was not assessed because there was no common evaluation tool. Two review authors (IY and JL) independently assessed the quality of the included qualitative studies using COREQ and CASP and reviewed and agreed. COREQ is divided into three domains: (1) Research team and reflexivity, (2) Study design, and (3) Analysis and findings, and consists of 32 checklists. It allows a qualitative researcher to check whether all the contents that should be included in the qualitative research paper are written through each checklist.<sup>33</sup> In this research, when there were more than two questions in an item, the sub-items of the item were created and one question per item was assigned. Thus, the studies were evaluated with 35 items in total. The CASP checklist is approached largely from three aspects: (1) Whether the research is valid or not, (2) What the results are, and (3) Whether the results are helpful or not. Ten items allow researchers to think about these questions structurally, each item includes hint questions to help users understand.<sup>34</sup> In this study, 10 items were divided into 29 sub-items according to the existing study results<sup>38</sup> and evaluated as Y or N for each sub-item.

## 3. Results

### 3.1. Descriptive numerical analysis and overview

We searched the literature until July 2019 and ended up with 1305 papers including 1011 from electronic databases and 294 from other sources. A total of 1271 studies remained after removing duplicates. Initially, 1168 were excluded by title and abstract screening. The remaining 103 articles were assessed for eligibility by full text. Finally, nine articles were included in the review (Fig. 1). Among the included studies, 6 were quantitative<sup>39–44</sup> and 3 were qualitative.<sup>45–47</sup> A summary of the selected papers is provided in Table 1. Among the 6 quantitative studies, four<sup>39,40,42,43</sup> were about the perceptions of medical workers and medical college students on KWCT, one<sup>44</sup> was on satisfaction and demand of medical workers participating in the KWCT pilot project, and one<sup>41</sup> was on the perceptions and demand for the coordinators' jobs. The questionnaires used in 6 studies were not validated and standardized, but were composed of questions about KWCT developed by the researchers. The methods of data collection were e-mail surveys<sup>42,44</sup>, post mail surveys,<sup>39–41</sup> and a face to face survey.<sup>43</sup> The total number of par-

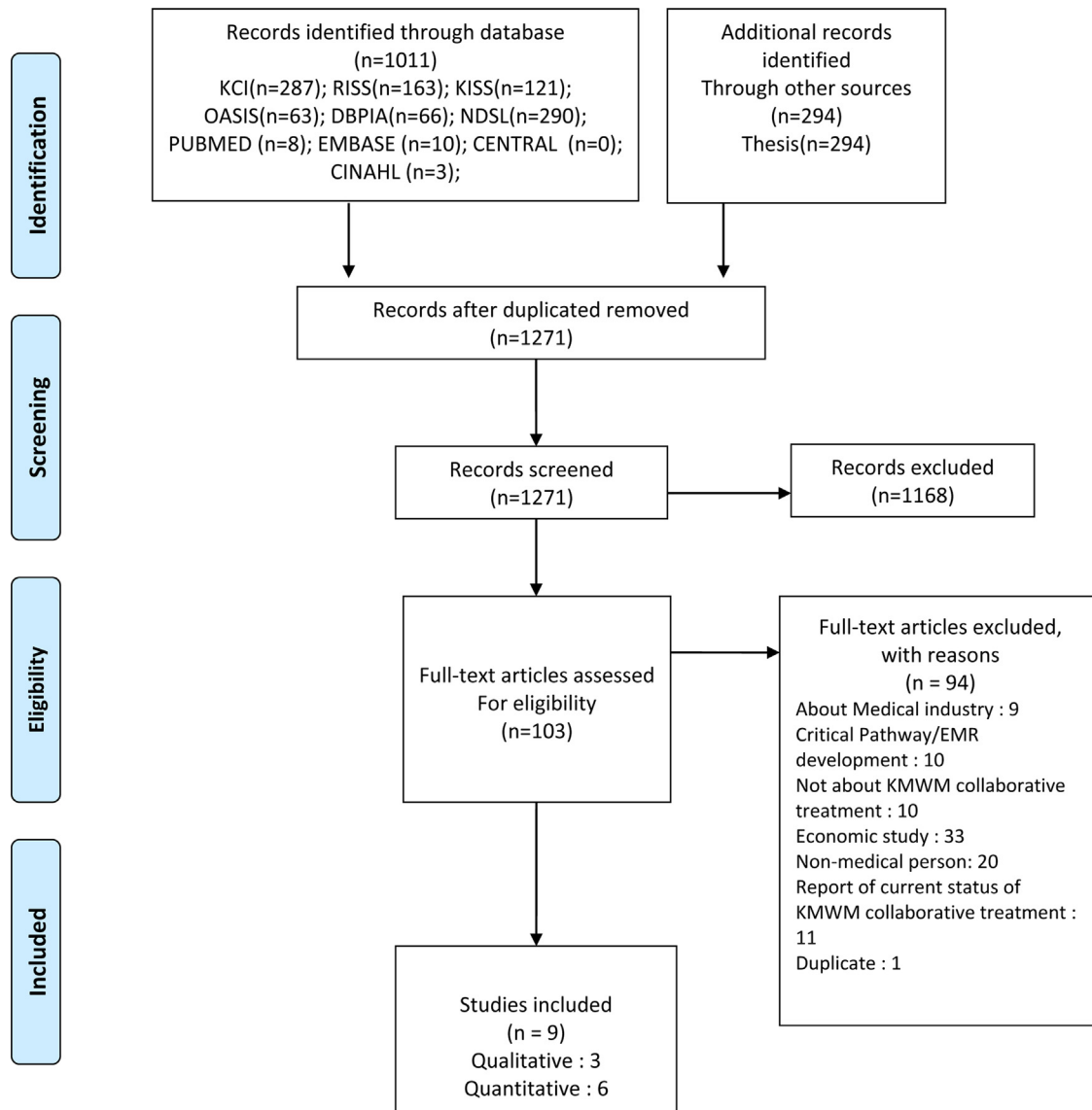


Fig. 1. PRISMA flow chart.

Participants in the 6 studies was 654 (range, 27–348), and the response rate was over 80% in 3 (100%,<sup>43</sup> 86.1%,<sup>40</sup> and 81.8%<sup>44</sup>) and 40–60% in 3 (50.6%,<sup>42</sup> 40.2%,<sup>39</sup> and 40%<sup>41</sup>). The three qualitative papers finally selected were as follows: (1) in depth interview with phenomenological research about experience of coordinator work (published 2011,  $n = 5$ ),<sup>45</sup> (2) in depth interview with thematic analysis based on grounded theory about the conflict and future direction of KWCT (published in 2014,  $n = 15$ )<sup>46</sup>; and (3) field research with interview about relationship forming pattern between MDs and KMDs in the KWCT process (published in 2018,  $n = 24$ ).<sup>47</sup>

### 3.2. Thematic analysis of quantitative studies: perceptions, attitudes, and demands

The responses surveyed in quantitative studies were classified into three themes: perceptions, attitudes, and demands on KWCT. The results of each study were compared and analyzed (Table 2).

#### 3.2.1. Theme 1: perceptions

**3.2.1.1. Basic knowledge.** A question about basic knowledge, “know/heard about KWCT” was examined. The study conducted by Ryu (2009)<sup>39</sup> showed that the positive response in basic knowl-

edge among WMDs working at a KWCT hospital was statistically higher than that among WMDs working at a non-KWCT hospital. According to Jeong (2010a)<sup>40</sup> and Chung (2016),<sup>43</sup> Western medicine university students (WMS), Korean medicine university students (KMS), WMDs and nurses knew/heard about KWCT at least 80% and more. A significantly higher number of KMS had heard about KWCT compared with WMS. The following is a description of the perception and attitude on KWCT, which provides a snapshot of the medical society’s perspective.

**3.2.1.2. Perceptions.** Each study mainly focused on the perception about KWCT which revealed the current status of KWCT after 2009 (allowing cross employment of medical doctors with other types of medical licenses). Medical staff perceived that there were several appropriate diseases for KWCT<sup>39,40,43</sup> and KWCT is sometimes necessary.<sup>39,40,42,43</sup> Specifically, Ryu (2009) showed that WMDs working at KWCT hospitals evaluated the necessity and effectiveness of KWCT significantly higher than those working at non-KWCT hospitals.<sup>39</sup> In the Jeong (2010a)’s study, KMS reported more positive response than WMS about necessity and efficacy of KWCT.<sup>40</sup> In 2012 Lee’s study,<sup>42</sup> only 35.7% of WMDs working at non-KWCT hospital showed a positive response about the effect of KWCT,

**Table 1**  
Research subjects, methods, and participants of selected studies

Year, first author	Research subjects	Research methods and participants
<b>Quantitative studies</b>		
2009, Ryu <sup>39</sup>	Perception of KWCT among WMDs working in KWCT hospitals vs WM hospitals	(Survey via mail) 77 WMDs working at 5 KWCT hospital and 132 WMDs working at 1 WM hospital; response rates 40.3% and 40.2%, respectively
2010, Jeong (a) <sup>40</sup>	Attitude of KM, WM, and nursing students toward KWCT	(Survey via mail) 185 WM students, 123 KM students, 230 nursing students; response rate 86.1% (348/404)
2010, Jeong (b) <sup>41</sup>	Coordinators' roles and activation plans on KWCT	(Survey via mail) 51 KWCT coordinators (nurses) from 28 hospitals 16 coordinators at WM hospitals and 35 coordinators at KM hospitals; response rate based on hospital 40% (28/71)
2012, Lee <sup>42</sup>	Perception of WMDs employed to WM university hospital on the KWCT	(Survey via e-mail) 1 WM university hospital; 44 WMDs; response rate 50.6% (44/87)
2016, Chung <sup>43</sup>	Attitude of medical professionals toward development of integrated medical model for medical consumers	(Face to face survey) WM based on 1 hospital (KMDs are not employed); 50 WMDs, 50 nurses; response rate 100% (100/100)
2018, Lee <sup>44</sup>	Satisfaction and demand of healthcare providers who participated in a collaborative first-stage pilot project between KMs and WMs	(Survey via e-mail) Nationwide pilot project participants (17 hospitals); KMD (18), WMD (9); response rate 81.8% (27/33; KMD 85.7%, WMD 75.0%)
<b>Qualitative studies</b>		
2011, Yu <sup>45</sup>	Coordinators' experiences in KWCT	In depth interview, phenomenological research; 5 coordinators (nurses) from 4 KWCT hospitals
2014, Lim <sup>46</sup>	Conflicts and Future Direction of Integrative Medicine in Korea	In depth interview, thematic analysis with grounded theory; 5 KMDs (1 KM hospital, 2 clinics, 2 health related companies), 6 WMDs (2 professors, 3 primary clinics, 1 general hospital), 4 TCMD (1 USA, 2 China, 1 Australia)
2018, Park <sup>47</sup>	The process of: 1) accumulating medical knowledge 2) forming a relationship between KMDs and WMDs	Field research with interview; 12 KMD, 2 KMS, 6 WMD, 2 Ad (from 3 KM hospitals and 1 WM hospital)

Ad, administrator; KM, Korean medicine; KMD, Korean medicine doctor; KMS, Korean medicine university student; KWCT, Korean medicine and Western medicine cooperative treatment; NS, nursing university student; TCMD, traditional Chinese medicine doctor; WM, Western medicine; WMD, Western medicine doctor; WMS, Western medicine university student.

while 50.0% showed a negative response. Interestingly, according to Chung (2016), 30% of WMDs and 80% of nurses who worked at a non-KWCT hospital responded that they needed KWCT.<sup>43</sup> It showed that the negative perception of WMDs is noticeable among non-experienced WMDs. Meanwhile, in the study conducted by Lee (2018), the entire medical staff (both WMDs and KMDs) who participated in the first stage KWCT pilot project showed positive responses regarding patients' convenience improvement (88.9%), the treatment efficiency increased (59.3%), and the diagnostic efficiency increased (55.6%).<sup>44</sup> The most common reason for the need for KWCT was the synergetic therapeutic effect (39.6%).<sup>43</sup> In addition, in the two studies (Ryu, 2009; Lee, 2012), musculoskeletal disease therapy and rehabilitation medicine therapy were reported to be the most suitable areas for KWCT.<sup>39,42</sup> Finally, in terms of satisfaction about KWCT, the WMDs judged that patient's satisfaction showed a high positive response (62.5%).<sup>42</sup> As mentioned above, the most medical workers (both WMDs and KMDs) were satisfied (88.9%) with increased convenience of the patients by KWCT.<sup>44</sup> On the contrary, the negative perception that Korean medicine (KM) is unscientific, lack of competitiveness, or that KWCT is not cost-effective, was higher among WMDs working at non-KWCT hospitals than among those working at KWCT hospitals.<sup>39</sup> As a result of the studies conducted by Lee (2012)<sup>42</sup> and Chung (2016),<sup>43</sup> the negative perception of actual KWCT seems to have resulted from distrust caused by lack of research evidence and misunderstanding about KM. The following is a detailed description of the attitudes toward KWCT that have been caused by this perception.

### 3.2.2. Theme 2: attitudes

The attitude toward KWCT is divided into two questions: whether to engage in KWCT or not, and whether to recommend KWCT or not. In a study conducted by Ryu (2009), WMDs working at KWCT hospitals were more likely to recommend KWCT than WMDs working at non-KWCT hospitals.<sup>39</sup> This is an example of the fact that if the KWCT is supported by institutional effort, the recommendation of KWCT could be increased. In addition, 59% of WMDs at non-KWCT hospitals who have no experience of KWCT were

unwilling to engage in KWCT. These results were not consistent to the patients' positive response about KWCT (62%) in the same survey.<sup>42</sup> Other questions were about attitude, necessity, interest, and preferred type of KWCT. The following is a description of the actual medical staffs' demand for KWCT.

### 3.2.3. Theme 3: demand

To activate KWCT, mutual respect is basically needed, and (1) legal/institutional support, (2) administrative support, (3) education, and (4) research were mentioned. Details of each category are as follows:

- 1) Legal and institutional support: license unification,<sup>43</sup> improvement on health insurance system,<sup>39,43</sup> and establishment of coordinator system<sup>41</sup>
- 2) Administrative support: establishment of KWCT center,<sup>44</sup> development of KWCT manual,<sup>39,43,44</sup> and medical term unification<sup>42</sup>
- 3) 'Education': college curriculum,<sup>39,42,43</sup> KWCT education,<sup>39,43</sup> academic exchange,<sup>42</sup> and coordinator education<sup>41</sup>
- 4) Research 'supporting the research'<sup>39,42</sup>

In particular, development of the clinical practice guideline (CPG) was mainly required in recent studies.<sup>43,44</sup> This implies that without evidence based CPG, activating KWCT is difficult because various legal and administrative troubles (such as legal responsibility on medical malpractice) cannot be solved due to the absence of CPG. Therefore, activation of KWCT seems to be the task of a macro system that requires nationwide legal and administrative support rather than the responsibility of micro system to be solved by individual medical workers.

### 3.3. Qualitative studies: methods, themes, categories, and in vivo coding

Three qualitative studies were conducted for KWCT among medical workers including MDs, KMDs and nurses (Table 3).

**Table 2**  
Perception, Attitude, and Demand From Quantitative Studies

Year, author	Perception	Attitude and demand
2009, Ryu	<p><b>(Perception of WMDs about KM: hired to KWCH vs non-KWCH)</b> Experience about KM as a patient (16.7% vs 5.7%)</p> <p>Value of KM for disease management (3.29 ± 0.82 vs 2.83 ± 1.08) Unique advantages of KM (3.14 ± 0.86 vs 2.53 ± 1.09)* (KWCH ↑)</p> <p>Non-scientific nature of KM (3.18 ± 0.68 vs 3.69 ± 0.99)* (KWCH ↓)</p> <p>Lack of competitiveness of KM than WM (3.22 ± 0.75 vs 3.84 ± 1.01)* (KWCH ↓)</p> <p><b>(Perception of WMDs about KWCT: hired to KWCH vs non-KWCH)</b> Be well acquainted with KWCT (3.77 ± 0.84 vs 2.90 ± 0.92)* (KWCH ↑) Need for KWCT (3.18 ± 0.92 vs 2.61 ± 1.07)* (KWCH ↑) KWCT relieves academic distrust (3.18 ± 0.83 vs 2.87 ± 1.23) KWCT means unification of license (3.85 ± 1.06 vs 4.01 ± 1.15)</p> <p>KWCT is preceding stage of license unification (3.03 ± 1.09 vs 2.87 ± 1.27)</p> <p>KWCT is not efficiency (3.22 ± 0.80 vs 3.36 ± 0.98) KWCT is desirable in my field of expertise (2.74 ± 0.98 vs 2.16 ± 1.14)* (KWCH ↑) KWCT has therapeutic effect (3.03 ± 0.80 vs 2.43 ± 1.06)* (KWCH ↑) KWCT has rehabilitation effect (3.48 ± 0.97 vs 2.94 ± 1.04)* (KWCH ↑) KWCT has health promotion/disease prevention effect (3.03 ± 0.80 vs 2.55 ± 1.03)* (KWCH ↑)</p>	<p><b>(Attitude of WMDs about KM: KWCH vs non-KWCH)</b> Intention to recommend KM when WM is ineffective (3.37 ± 0.96 vs 2.42 ± 1.11)* (KWCH ↑) Interest in KM (3.25 ± 0.71 vs 2.91 ± 1.26) Intention to use KM when WM is ineffective (3.00 ± 0.91 vs 2.39 ± 1.26)* (KWCH ↑) Intention to recommend KWCT (3.07 ± 1.07 vs 2.36 ± 1.45)* (KWCH ↑)</p> <p><b>(Demand of WMDs for KWCT: KWCH vs non-KWCH)</b> Interchange of university curriculum (3.35 ± 1.04 vs 3.24 ± 1.38) KWCT education for KMDs and WMDs (3.48 ± 0.72 vs 3.04 ± 1.44) Expand the target diseases for KWCT (3.42 ± 0.85 vs 2.90 ± 1.34)* (KWCH ↑) Develop standard operation procedure for KWCT (3.80 ± 0.89 vs 2.98 ± 1.45)* (KWCH ↑) Improve health insurance reimbursement system (3.81 ± 0.96 vs 3.41 ± 0.72) Legal and institutional support (3.90 ± 0.76 vs 3.59 ± 1.61) Support Research project (3.84 ± 1.01 vs 3.67 ± 1.63)</p>
2010, Jeong (a)	<p><b>(Perception about KWCT: WMS vs KMS vs NS)</b> Heard about KWCT (85.9% vs 100% vs 79.3%)* Experienced KWCT as a patient (2.2% vs 9.8% vs 2.3%)* Effective for disease diagnosis (15.7% vs 78.0% vs 59.2%)* Effective for disease treatment (48.6% vs 87.8% vs 88.5%)* Effective for disease prevention (35.7% vs 78.9% vs 75.9%)* Medical costs increase (91.4% vs 74.8% vs 75.9%)* Difficult to practice (78.4% vs 74.8% vs 59.8%)*</p>	<p><b>(Attitude about KWCT: WMS vs KMS vs NS)</b> Recommend KWCT to patient (37.3% vs 89.4% vs 83.9%)* Preferred format of KWCT (same question)* - Mainly WM + Complementary KM (85.5% vs 2.5% vs 57.5%) - Mainly KM + Complementary WM (0.6% vs 18.0% vs 0%) - WM diagnosis and KM treatment (0.6% vs 12.3% vs 7.5%) - KM diagnosis and WM treatment (0% vs 0.8% vs 0%) - Concurrent practice of KMD and WMD (11.7% vs 59.0% vs 31.6%) - Treatment by unified licensed physician (1.7% vs 7.4% vs 3.4%)</p> <p><b>(Demand for KWCT coordinator)</b></p>
2010, Jeong (b)	<p><b>(Perception: problems and difficulties when performing coordinator work)</b> Lack of educational opportunities (91.7%) Unclear role (91.7%) Unreasonable national health insurance reimbursement price for KWCT (87.5%) Excessive workload (87.2%) Lack of understanding and cooperation by WMD (83.0%) Lack of understanding and cooperation by KMD (65.2%) Lack of understanding and cooperation by administrators (87.2%) Lack of understanding and cooperation by patients (78.7%) Lack of domain knowledge about KWCT (78.7%) Simple and boring work (55.3%)</p>	<p>Clarification of roles and rules of coordinator work (97.9%) Establish curriculum for coordinator (96.0%) Active public relations about KWCT coordinator (91.6%)</p> <p>Legal regulation about KWCT coordinator (89.6%) Hospital level support (like incentive) (89.4%) Establish KWCT association (87.6%) Creation of certification of KWCT coordinator (76.1%)</p>
2012, Lee	<p><b>(Perception of WMDs about KWCT)</b> Perception on the KWCT: Very positive (4.5%), Positive (36.4%), Neutral (43.2%), Negative (9.1%), and Very negative (6.8%) Experience of KWCT: Yes (31.8%), No (68.2%) Effect of KWCT (from experienced person): Positive (35.7%), Negative (50.0%) Self-evaluation of KWCT: Highly positive (7.7%) Positive (17.9%) Moderate (51.3%) Negative (15.4%), Highly negative (7.7%) Department that shows high performance through KWCT: Rehabilitation Medicine (40.5%), Neurology (25.5%), Orthopedics (17.0%), Cardiovascular (8.5%), Gastroenterology (8.5%) Department that is expected to achieve high performance through KWCT: Rehabilitation Medicine (34.8%), Orthopedics (28.3%), Neurology (17.4%), Anesthesiology (10.8%), Gastroenterology (8.7%) KM intervention that is unacceptable: wet cupping/venesection (46.7%). Herbal medicine (13.4%), dry cupping (11.6%), Chuna (10.0%), Moxibustion (10.0%), Acupuncture (1.6%) Barriers for KWCT: Lack of mutual academic understanding (43.1%), lack of research evidence (28%), lack of institutional support (11%), disease term difficult to understand (11%), lack of financial and human resources (3%)</p>	<p><b>(Attitudes of WMDs about KWCT)</b> Willingness of KWCT (from unexperienced persons): Yes (40%), No (60%) Patients' reactions about KWCT: Positive (62.5%), Neutral (31.3%), Negative (6.2%)</p> <p><b>(Demand of WMDs: methods to improve KWCT)</b> (same question)</p> <p>Mutual understanding and respect (39%)</p> <p>Active interchange via regular academic seminars (29%) Curriculum about counter-partner in university education (13%) Standardize the terms (9%)</p>

Table 2 (Continued)

Year, author	Perception	Attitude and demand
2016, Chung	<p><b>(Perceptions of WMDs and nurses about KWCT)</b>                      The reason KWCT is not needed:                      Negative effect on conventional treatment (47.1%), similar therapeutic effect with additional cost (33.3%), conventional WM treatment is enough (19.6%)                      The reason KWCT is difficult to carry out:                      Lack of evidence (49.6%), small effect with additional cost (20.1%), lack of continuous management system (18.0%), lack of credible partner (11.5%)                      The reason KWCT is needed:                      Synergetic therapeutic effect (39.6%), overcome limitation and adverse effect of WM (20.9%), diagnostic/evaluation procedure to evaluate treatment effect (18.7%), reduce unnecessary health care costs (11.0%), patients' satisfaction with increased medical services (9.9%)                      Anticipated effect of KWCT:                      Increase disease preventive and therapeutic effects (37.3%), development of the medical system in Korea by academic interchanges (21.1%), reinforcement of International Competitiveness Through New Treatment Technology and New Drug Development via KWCT (15.5%), decrease unnecessary cost for mal-practice and reinforcement of medical publicity (14.9%), cost effectiveness and decrease medical cost (8.1%).                      A disease in need of WKCT (WMD vs nurse):                      Exist (6% vs 6%), not exist (60% vs 22%), don't know (34% vs 72%)</p>	<p><b>(Attitude of WMDs and nurses about KWCT)</b>                      Recognition and interest about KWCT (WMD/nurse):                      Never heard (14/18%), Heard but no interest (68/44%),                      Heard and interested (18/38%)                      Necessity of KWCT (WMD/Nurse):                      Not necessary (62/8%), Necessary (30/82%), Do not know (8/10%)</p> <p><b>(Demand of WMDs and nurses for KWCT)</b>                      Solution (same question):                      Supporting CPG development research (32.4%)                      Unification of KM/WM license (23.4%)                      Strengthen education of integrative medicine (23.4%)                      Improve the health insurance system and strengthen incentives (17.90%)</p> <p>Ideal format of KWCT (same question):                      Establish integrative medicine center (42.4%)                      Mutual employment of a specialist medical practitioner (28.0%)                      Consultation between hospitals (16.1%)                      Establish a public hospital of KWCT (7.6%)</p>
2018, Lee	<p><b>(Perception: satisfaction of KMDs and WMDs on KWCT pilot project)</b>                      Improved patient convenience (88.9%)                      Therapeutic efficiency (59.3%)                      Diagnostic efficiency (55.6%)                      Increased sales (40.7%)</p> <p><b>(Perception: evaluate change after participation on the pilot project from KMDs and WMDs) †</b>                      Quality improvement of collaborative treatment (70.4%)                      Sharing philosophy and values (48.1%)                      Cooperation in terms of results (efficacy, economy) (74.1%)                      Cooperation in terms of structure (63.0%)                      Cooperation in terms of process (51.9%)</p>	<p><b>(Demand of KMDs and WMDs for collaborative treatment or administrative procedures)</b>                      Specialized center or clinic (70.4%)                      Standard operational procedure (manual) (88.9%)                      Specialized coordinator (63.0%)                      Simplifying administrative procedure (88.9%)</p> <p><b>(Demand of KMDs and WMDs for improvement on the collaboration pilot project)</b>                      Including co-prescription of medicine in pilot project (77.7%)                      Expansion of participating hospitals (62.9%)                      Including dental clinic (22.2%)                      Public relations (82.5%)</p>

Percentages represent positive responder ratios. Numbers indicate means from a 5-point Likert scale; †, responder ratio more than 5 points on a 7-point Likert scale \*, statistically significant.

CPG, clinical practice guideline; KM, Korean medicine; KMD, Korean medicine doctor; KMS, Korean medicine university Student; KWCH, Korean medicine and Western medicine Cooperative Treatment Hospital; KWCT, Korean medicine and Western medicine Cooperative Treatment; NS, Nursing university student; SD, standard deviation; WH, Western medicine hospital; WM, Western medicine; WMD, Western medicine doctor; WMS, Western medicine university student

As a result, nurses (coordinators) mentioned that they started the coordinator job without basic knowledge of KM or KWCT.<sup>45</sup> In the process, it was shown that they were forming their identity as medical professionals, not just as nurses who engaged in KWCT (in vivo 3–5). Particularly, the participants thought that the coordinator should be able to play a role as the manager of KWCT with the acquisition of knowledge that can encompass KM and WM (in vivo 6–8). In addition, they had their own KWCT skills. They had been working with various occupations and department of hospitals including patients, and they experienced that work gets easier when there is a personal intimacy. Therefore, they worked hard to maintain their relationships, recognizing that they could do more for patients when they are in good relationship with other people/departments at the hospital. However, these micro-level efforts (in vivo 9–11) have been limited due to lack of institutional support from hospitals or the state (in vivo 12–14). The demands of the coordinator mentioned in the article were education course, guidelines, and amendments to law.

In comparison, the findings of the study of KMDs, WMDs, and Chinese medical doctors (CMDs) focused mainly on the con-

licts and license unification of KMDs and WMDs.<sup>46</sup> In particular, in the category named “capitalism market competition system”, the authors reported that conflicts between the two groups are inevitable. Specifically, they reported on collectivism/profit of KMDs, professionalism of KMDs, and low academic credibility of KM. These results were not new and not the result of thoughtful consideration. In addition, government roles such as legal and administrative support for KWCT, was regarded an important factor in activating KWCT. In addition, using scientific methods of KM was mentioned by both KMDs and WMDs. This indicates that KMDs also recognized that KM should adopt scientific paradigms and methods. However, KMDs also know that research methods specific to KM is also needed for scientification (in vivo 25–29). The demands for better KWCT mentioned in the article were academic integration, education, safety of herbal medicine, trust building, and scientification of Korean medicine. The perception of KWCT mentioned in the article included overcoming occupational egoism, focusing on patient requirement, barrier to license unification, different medical paradigms, and weakening of originality.

**Table 3**  
Themes, Categories, and In Vivo Coding From Qualitative Studies

Year, first author	Theme and category	Perception, attitude, and demand	In vivo coding	
2011, Yu	<b>1) Started without a system or knowledge</b>	<b>a. Feeling burdened with unknown work</b>	Others	In vivo 1 "I had no idea what to do first or what to know first." "I felt like there's no one to teach me."
		<b>b. Starting a job without basic knowledge</b>	Demand	In vivo 2 "I wish I could have KWCT-related courses. There's really nothing like that. There's no course anywhere."
	<b>2) Shaping the role identity</b>	<b>a. Creating business tools and developing work capacity</b>	Others	In vivo 3 "The KWCT Center manual? We made it. (ellipsis) We made it based on regulations of the Western Medicine Department."
		<b>b. Getting a rough outline of the duties of the coordinator</b>	Others	In vivo 4 "At first I thought, 'I came down only to work as an assistant'. 'But now I think I am working more like the coordinator. My mind has changed."
		<b>c. Be proud about the job</b>	Others	In vivo 5 "I'm doing something more professional. I like it so much. I feel proud of that. All nurses are not the same, and because I work right next to professors, I feel like my knowledge getting wider than general nurses."
	<b>3) Role as an expert is required</b>	<b>a. Comprehensively support patients and parents</b>	Others	In vivo 6 "When you do the coordinator job, the patients come first and start with counseling and talk about family history and so on. I guide them from the reception to doctors and have a lot of conversations with them. Eventually I became comfortable with talking to them."
			Demand	In vivo 7 "To support this kind of patients satisfactorily requires a lot of knowledge and experience. (ellipsis) I think people with these can do this job to provide accurate information and guidance."
		<b>c. Act as a medium between water and oil</b>	Demand	In vivo 8 "Western medicine doctors (ellipsis) and Korean medicine doctors (ellipsis) want me to deliver messages to opponents. Then I told them I will deliver it carefully. Things can go bad if they talk directly to each other. But what I did made things go smoothly between them. I think I've done a lot of things this way."
	<b>4) Form synergetic relationships with various occupations</b>	<b>a. Has a close relationship with the KMD/WMD</b>	Others	In vivo 9 "They seem to treat me well personally. They give me workloads that I can handle but encourage me when I accomplished something."
		<b>b. Recognize the differences between coordinators and other nurses</b>	Others	In vivo 10 "The nurses who work in the KWCT ward know that I am the coordinator so they're very nice to me. (ellipsis) So working with them is pretty easy for me. But nurses who work in other wards do not know what's going on here. (ellipsis) I have a little trouble working with such people."
		<b>c. Form a strong supportive relationship in cooperation with administrative duties</b>	Others	In vivo 11 "We ask a lot of things about the department of administration, so I feel sorry for them sometimes."
	<b>5) Fall into a dilemma</b>	<b>a. Feel uncomfortable about being asked to play a multiplayer role</b>	Others	In vivo 12 "The work of KWCT patients itself is never overburdened but rather weak. In addition, I'm doing various tasks such as administrative work, data request issues, data collection, and so on."
			Others	In vivo 13 "Professors, medical staffs, and administrators don't know much about coordinators. (ellipsis) Their interest in or perception of the coordinator is still low."
		<b>c. Only responsibility is given, and rights are lacking</b>	Demand	In vivo 14 "I have a lot to be responsible for, but I think there is a lack of legal grounds or authority to support a job role".
	2014, Lim	<b>1) Conflicts of KM and WM</b>	<b>a. Capitalist market competition system</b>	Perception
<b>b. KMD tries to protect vested profit</b>			Perception	In vivo 16 "I think the purpose is to stop the pharmacists from selling herbal medicine in order to keep their position and profit. I think the Korean Association of Korean Medicine is problematic, as it prevents industrial development in the name of keeping the tradition of oriental medicine."
<b>c. Professionalism of KMD/WMD</b>			Demand	In vivo 17 "In the practice of acupuncture by medical doctors and using medical devices by Korean medicine doctors, the court's judgment is based on whether medical doctors have the ability to use it or not. In other words, whether or not you have gone through the curriculum is the main issue. I think there is no problem if you got proper credits."
<b>d. Low trust for the partner's medical system</b>			Perception	In vivo 18 "The lack of understanding of Korean medicine among Western medicine doctors is the root cause. Of course, there is no opportunity for them to learn about Korean medicine, but (ellipsis) I think there is not enough effort to get Western medicine doctors to understand Korean medicine."



Table 3 (Continued)

Year, first author	Theme and category	Perception, attitude, and demand	In vivo coding		
2018, Park	<b>2) Unification of KM and WM licenses</b>	<b>e. No point of contact for cooperative KWCT</b>	Perception	In vivo 19“ <i>The question is what is best for the patient. Although there are two different paradigms, there will be a priority in the treatment of diseases, and I believe it will be important to agree on what kind of treatment will be better for the patient depending on the main problem of the patient</i> ”	
		<b>a. Absence of academic link between KM and WM</b>	Demand	In vivo 20“ <i>Communication for integration is a priority before cooperative treatment, but integration is difficult as long as both medical communities use different medical terms. (ellipsis) I think it's the first step to establishing enough links for academic integration before the integration of licenses.</i> ”	
		<b>b. Confusion in clinical practice</b>	Perception	In vivo 21“ <i>Academically, I think that the integrated medicine research of Korean medicine and Western medicine will be of great significance and value. But an integrated medical system, like the Chinese-Western Combination Doctor System in China, is likely to cause a lot of confusion in the real clinical practice field.</i> ”	
		<b>c. Different understanding about the medical paradigm of each other</b>	Perception	In vivo 22“ <i>It is important that the patient be treated by the same medical paradigm. It is not a problem about a unified or dualized license system approach, because even if medical license is unified, there is a possibility that the conflict between Korean and Western medicine could be tens of times higher.</i> ”	
		<b>d. Social drive</b>	Perception	In vivo 23“ <i>The reason for the need for unity should be made when it is recognized that it is necessary to combine the merits of Korean medicine and Western medicine in treating a disease.</i> ” In vivo 24 “ <i>I think it's important to see the social factors of that era to tell whether there's a problem with the current medical system or not. Korea currently has no motivation for medical unification.</i> ”	
	<b>3) Opinions on the future direction of KM and WM</b>	<b>a. A system based on reality/social legitimacy</b>	Perception	In vivo 25“ <i>Korea should embrace the strengths of China and Japan and seek ways to develop its own system.</i> ”	
			Demand		
		<b>b. Guarantee the originality of KM</b>	Perception	In vivo 26“ <i>Integration of medical qualifications ultimately acknowledges professionalism, but weakens in terms of originality.</i> ”	
			Demand	In vivo 27“ <i>The government should create a 'Herbal Medicine Distribution Corporation' to ensure the safety of herbs. (ellipsis) The government must find a way for people without paying too much attention to the opinions of Korean or Western medicine doctors.</i> ” In vivo 28“ <i>I believe that the medical system development should be firmly established by government in order to reduce the conflict and build trust between Korean medicine and Western medicine.</i> ”.	
	<b>d. Scientification of KM</b>	Demand	In vivo 29“ <i>A scientific way is not a matter of destroying tradition, but a linguistic instrument for communicating with modern society. The slower the pace of scientific research of Korean medicine, the faster the isolation of Korean medicine in modern society.</i> ”		
		Demand			
	<b>1) Clinical meaning and process of KWCT</b>	<b>1) Clinical meaning and process of KWCT</b>	Perception	KWCT in the actual clinical process is not a 'co-management' system where medical professionals can exchange opinions and see the direction of care together, but rather a 'consultation' process for their own patients or a 'referral' for further care.	
			<b>2) A medium connecting KMD and WMD during KWCT: biomedical knowledge of KMD</b>	Perception	In the KWCT process, Western medicine doctors do not have much knowledge and interest in Korean Medicine, so the biomedical knowledge of Korean medicine doctors plays a crucial role in communication between doctors and Korean medicine doctors.
				Perception	What was commonly found in all four hospitals was the imbalanced relationship between Western medicine doctors and Korean medicine doctors in terms of the frequency of referrals, dependency on counter-partners, interest in and understanding of medical knowledge. In most cases, it was a process that Korean Medicine doctors to be conscious of importance of biomedical knowledge and the strengths of the Western medicine healthcare system.

KM, Korean medicine; KMD, Korean medicine doctor; KWCT, Korean medicine and Western medicine cooperative treatment; WH, Western medicine hospital; WM, Western medicine; WMD, Western medicine doctor.

**Table 4**  
Research Map

			Quantitative studies				Qualitative studies				
			2009Ryu	2010 (a)Jeong	2010 (b)Jeong	2012Lee	2016Chung	2018Lee	2011Yu	2014Lim	2018Park
Perception	Knowledge	Whether or not, heard about KWCT	Y	Y			Y				
		Positive sides of KWCT	Y	Y		Y	Y				
	Negative sides of KWCT	Applicable diseases with KWCT	Y	Y			Y				
		Satisfaction on KWCT				Y <sup>a</sup>		Y			
		KWCT is unnecessary	Y				Y				
		Difficulties in conducting KWCT		Y		Y	Y			Y	Y
Attitude	The necessity of KWCT	Y			Y						
	Whether or not, be interested in KWCT	Y									
	Intentions to recommend KWCT	Y	Y								
	Intentions to do (conduct) KWCT				Y						
	Preferred KWCT types		Y			Y					
Demand	Mutual respect and understanding	Legal/institutional			Y				Y		
		Legal/Institutional support	Y			Y					
	Administrative	License integration					Y			Y	
		Insurance fee system improvement	Y				Y				
		Coordinator system			Y			Y	Y		
		Establishment of a KWCT center						Y	Y		
	Educational	Develop CPG and standard KWCT manual	Y				Y	Y	Y	Y	
		Ideal format of KWCT type					Y				
		Incentives			Y		Y				
		Standardize the terms				Y					Y
	Research-related	Mutual cross education at university	Y			Y	Y			Y	
		KWCT education for WMD and KMD	Y				Y				
	Research-related	Seminar				Y					
		Education for KWCT coordinator			Y				Y		
Evidence		Y			Y				Y		
		Financial support for research	Y								

<sup>a</sup> Satisfaction of patient perspective. CPG, clinical practice guideline; KMD, Korean medicine doctor; KWCT, Korean medicine and Western medicine collaborative treatment; WMD, Western medicine doctor.

These findings are worth comparing with the results of the study on KWCT with WMDs, KMDs, administrators, and KMSs working at KWCT hospitals.<sup>47</sup> This study reported that compared to WMDs, KMDs frequently asked for KWCT, and in the process, KMDs tried to educate themselves with WM whereas WMDs remained with low interest and understanding of KM. These results seemed to indicate the imbalance in the KWCT system. As a result, the following questions were not explored further: Is KWCT needed? Who needs it? and Why? This will be discussed in the discussion section. The perception of KWCT mentioned in the article included clinical meaning and process of KWCT, importance of biomedical knowledge, and an imbalanced relationship. The quality of qualitative research was evaluated by using COREQ and CASP (Supplementary 1, 2).

### 3.4. Research map

A research map was presented for visualization on which subjects were covered in which studies (Table 4). Quantitative research since 2009 mainly focused on perceptions, attitudes, and demand. However, qualitative research only explored perception and demand. This suggests that in-depth discussion about the attitude of the medical society to KWCT in qualitative research is needed. Meanwhile, the presented qualitative research reported the dynamics, conflicts, and situations experienced by WMDs and KMDs in real clinical practice.<sup>47</sup> This is a meaningful study that showed the real world description of KWCT as a part that cannot be explored via quantitative study. In addition, a study<sup>45</sup> on coordinators reported the grievances of the KWCT working group. This also reported a situation that could not be identified by a quantitative approach. However, there is a limitation, in that the quantitative and qualitative studies yielded superficial results without exploring new results. We could not identify the in-depth barrier to KWCT and the in-depth demand for activation of KWCT. Therefore, confirming the results of this study and finding out what studies should be proposed in the future may be a helpful analysis for the future of KWCT. This will be described in the following discussion.

## 4. Discussion

### 4.1. Summary of findings

The present study collected and analyzed research on KWCT since 2009. As a result, there were 6 quantitative studies, and 3 qualitative studies, and each subject was summarized into perception, attitude, and demand for KWCT. The results of the study were as follows. The knowledge of WMS was lower than that of KMS, and their intention to recommend KWCT to patients was also low. These findings were in the same context as the WMDs who did not receive KM treatment, did not belong to KWCT hospital or did not perform the KWCT, were negative in the KWCT and had a lower cognition of the necessity. The lower the understanding of the other, the lower the credibility and negative reaction to KWCT. On the other hand, when actual KWCT was performed, they were perceived to be competitive in terms of patient satisfaction and treatment efficiency. To activate KWCT, the current system and method of KWCT should be improved. Mutual understanding and respect, legal/institutional support (insurance fee system improvement, coordinator system, etc.), administrative support (evidence-based manual development including CPG), education such as academic exchanges between KM and WM, and research activation were priority works needs to be done. Among the topics studied in quantitative research, qualitative research did not address the expected effects of KWCT, the type of KWCT preferred, and the diseases applicable to KWCT. Meanwhile, in depth, qualitative research on institutional support, internal efforts, mutual exchanges, and research support for creation of evidence is needed

for further research. In addition, in the process of KWCT mentioned in the existing qualitative research, it is necessary to conduct in depth qualitative and quantitative follow-up studies to explore the power relationship formed by WMDs and KMDs, the social institutional background causing such a relationship, and the conflict situation in such a relationship.

### 4.2. A policy that does not reflect on-site needs

The literature review on the previous studies before 2009<sup>23</sup> showed that in the late 2000s, the cognition of KWCT was higher and the perception/attitude was positive compared to the late 1990s. However, the need for KWCT saw a declining trend. In other words, WMDs do not recommend KWCT actively. In order to activate KWCT, it was reported that legal and institutional support was necessary from a macro-perspective, mutual understanding, and respect through education and research. In addition, the effective medical fields in KWCT were musculoskeletal diseases and pain diseases, and the type of KWCT preferred by medical students did not change (mainly WM with complementary KM). In this study, the basic knowledge of KWCT itself has increased more than before the 2009 study, but did not differ from the previous studies in terms of necessity and the demands for improvement of KWCT. These prove that the results of the previous study and demand from the clinical practice field were not reflected in the actual policy making and clinical field. The results show that the demand of the field is not supplemented in terms of institutional/policy aspects. However, it is noteworthy that there have been some advances. After cross-employment in 2009 and the KWCT pilot project in 2016, several practical needs were reported via quantitative/qualitative studies such as the development of CPG, completion of coordinator system, introduction of incentives, and so on. However, more qualitative and quantitative research is needed for policy development and budget based on in-depth understanding of the demand of the field.

### 4.3. Experiencing and understanding first, before policy and incentive

However, the most important point in the analysis of the results through this study was not policy supplementation or economic factor of the macro perspective. Achieving active cooperation and understanding the necessity of KWCT should be preceded by experiencing and understanding of each other. In a study conducted in 2012,<sup>42</sup> this part was pointed out. Also, the result of Ryu's paper showed that WMDs working in the KWCT hospital were more positive about the KM or KWCT.<sup>39</sup> In other words, these results indicate that the actual KWCT is influenced by the experience of cooperative treatment rather than the belief and valuation of WMDs/nurses. Therefore, it is important to motivate doctors to cooperate by introducing an incentive system in policy, to create opportunities to experience and understand KWCT, and to improve cognition.

### 4.4. Importance of conducting research and selecting research theme

In the preliminary interview conducted with our research, there was a mention that the research of KWCT works as seed money for mutual understanding (data unpublished). Continuous research can increase mutual understanding of both WMDs and KMDs. As mentioned above, for successful KWCT, researchers must report the vivid voice of the field. In particular, in-depth qualitative research on medical institutions that compare hospitals successful in KWCT, are needed to explore factors on successful KWCT. On the other hand, it is true that the most important reason for the need for KWCT (the patients) is insufficient. It should be remembered that KWCT is not for doctors, but for patients. Lee reported that 63%

of patients were satisfied with KWCT,<sup>42</sup> but willingness of KWCT among WMDs was relatively lower than the patient satisfaction ratio. There is a lack of research on patients who undergone KWCT. Studies on the actual cross-sectional status and demand for patient-centered KWCT can provide a strong basis for the improvement of KWCT in the medical field.

#### 4.5. Coordinator acts as a medium between WMDs and KMDs

For easier KWCT, a new job group called KWCT coordinator has been created. Demand for KWCT activation from the coordinator group perspective was presented in recent papers.<sup>41,45</sup> In our study, we found that understating each other is an important factor for accelerating KWCT. In the field of real work, in-depth studies on these occupations will be more necessary because they can mediate the conflicts between MDs and KMDs from a neutral point of view and serve as modulators for efficient KWCT.

#### 4.6. Suggestions for further research

There were several previous studies on the perception and attitude toward KWCT among WMDs, but no studies on KMDs. In addition, quantitative studies have explored the format, supporting policy, research topic, and appropriate disease for the KWCT system. However, there were no in-depth qualitative research with KMDs about barriers, experience, and improvement strategy for KWCT.

Since KWCT is already well known, it seems that it is necessary to provide data for successful settlement of KWCT as well as a pilot project,<sup>44</sup> rather than a simple questionnaire on basic knowledge and attitude in quantitative studies. It is necessary to select a priority to focus on research for successful KWCT. Through survey, we should ask about the appropriate disease to assess effectiveness, safety, and economic study. Accumulating fundamental data in clinical research that evaluates economic efficiency, safety, and effectiveness will be needed. Also, since the survey studies conducted after 2009 did not use standardized questionnaires and did not directly compare the perceptions of WMDs and KMDs, there is a limitation to grasp the factors that indicate the difference in perception on KWCT between the two. Thus, it is necessary to conduct direct comparative research between WMDs and KMDs using standardized questionnaires.

The existing qualitative research focused on the process of KWCT, the conflicts in KWCT, and license unification. However, there was no in-depth study on the success/failure experience of WMDs/KMDs working in the actual medical field of various KWCT hospitals. We also lack development strategies and demand in the field. Therefore, future qualitative research should focus on the success/failure experience of KWCT and the development strategy and practical demand in the field.

#### 4.7. Strengths and limitations

This is the first scoping review about KWCT to provide a summary, limitation, and future direction of research and policy making. This study has significance in that it collected data from quantitative and qualitative research after the announcement of mutual cross-employment in 2009, which is an important starting point for KWCT, and analyzed both quantitative and qualitative aspects for the first time. In addition, it will be helpful to identify future unmet research questions using a research map that visualizes the research questions mentioned in existing studies. Nevertheless, this study has the following limitations. The effect of KWCT and economic efficiency could not be identified by our research. The effect of KWCT is not within the scope of this study as it should be confirmed through clinical research. However, this study is meaningful as fundamental data for effective KWCT

because it is difficult to obtain good results in clinical research unless the voice of the field is effectively reflected. In addition, the scope of review was limited to only studies of medical workers, so the opinions of patients and other stakeholders such as policy makers were not known. The needs of doctors, the general public, and patients may be very different; thus, it is necessary to conduct separate studies.

#### 4.8. Conclusion

We found that the KWCT system was slightly improved after allowing cross employment. However, perceptions and attitudes of the medical occupational groups were not impressively changed, and there are still unmet practical and technical on-site demands. For better perception and attitude, this should be preceded by experience, mutual understanding, and respect. Academic exchange, education, supporting KWCT research and legal/institutional/administrative support is also important. We found several research gaps in KWCT, especially detailed demand and activation strategies about KWCT. In future quantitative studies, we should adopt a validated questionnaire. We also need to conduct in-depth qualitative research to identify on-site demand of medical occupational groups and stakeholders to improve KWCT implementation.

#### Author contribution

Conceptualization: JL, IY. Data curation: NA. Formal analysis: NA. Funding acquisition: NA. Investigation: KK. Project administration: JS. Resources: NA. Software: NA. Supervision: MC. Validation: NA. Visualization: NA. Writing – original draft: JL, IY. Writing – review & editing: MC.

#### Conflict of interest

The authors declare that they have no conflict of interest.

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#### Ethical statement

The project was submitted to the Institutional Review Board of National Medical Center in South Korea and obtained Ethical approval on April 4, 2019 (IRB No. H-1903-100-004).

#### Data availability

The data will be made available upon reasonable request.

#### Supplementary material

Supplementary material related to this article can be found, in the online version, at [doi:10.1016/j.imr.2020.100430](https://doi.org/10.1016/j.imr.2020.100430).

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