



## Review Article

# Current status of case reports and case series reported by Korean Medicine doctors in primary clinics: A systematic review

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## ARTICLE INFO

## Article history:

Received 1 October 2019

Received in revised form 13 April 2020

Accepted 16 April 2020

Available online 23 April 2020

## Keywords:

CARE guideline

Case report

Korean medicine

Korean medicine doctors

Systematic review

## ABSTRACT

**Background:** This study aims to review the current quantity and quality of case reports and case series published by clinical doctors who worked in local Korean medicine clinics.

**Methods:** Seven electronic databases, one in English and six in Korean, were searched for case studies authored by clinically-based Korean Medicine doctors (KMDs) and published in academic journals between January 2000 and December 2018. The following data were extracted: the number of cases per article, authorship order, types of academic journals, the number of articles published in the domestic or international academic journals by publication year, citation counts, and classification of diseases. We assessed the quality of the reports based on 28 items from the CAse REport (CARE) checklist.

**Results:** A total of 266 case reports or case series met the inclusion criteria. There were 125 articles (47.0%) in which all authors consist of who worked in Korean medicine clinics. The overall increase in the number of published articles by year showed a sharp increase after 2010. Articles were focused primarily on Korean medicine therapeutic and diagnostic approaches. The most commonly reported cases were diseases of the skin (346 or 40.9%). Overall, the quality of the reports was acceptable (75.3%) but several items such as diagnostic challenges, patient perspective, informed consent, intervention adherence and tolerability, and adverse events were substantially underreported.

**Conclusions:** To improve disease diagnosis and treatment, KMDs in clinical practice should be encouraged to report and publish case studies, using the CARE checklist to ensure quality.

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## 1. Introduction

The mainstream Korean healthcare system is two-pronged: one section corresponds to conventional medicine by medical doctors; the other is Korean medicine (KM) by Korean Medicine Doctors (KMDs). KMDs are mainstream health service providers who rely on traditional East Asian therapeutic techniques such as acupuncture, moxibustion, and herbal medicines.<sup>1</sup> The number of licensed KMDs in 2016 was 23,460, reflecting an average annual increase of 748 KMDs since 2007.<sup>2</sup> Among KMDs, 65.6% (15,383) worked in local Korean medicine clinics in 2016. Korean medicine clinics are primary care facilities. Consistent with the recent increase in the number of KMDs, the number of Korean medicine clinics

has increased from 10,895 in 2007 to 13,860 in 2016.<sup>2</sup> In 2016, 12,433,148 people were treated in Korean medicine clinics for various diseases, ranging from common colds to chronic diseases. This represents 93.6% of the total outpatients treated with KM.<sup>3</sup>

Recently, the literature on KM has been growing in recognition of evidence-based medicine mandates, and the need to make patient-related decisions based on the best clinical research available.<sup>4,5</sup> Furthermore, in a nationwide online survey with KM students, respondents requested a greater emphasis on evidence-based medicine in the KM educational curriculum.<sup>6</sup> Although case report (CR) is considered the weakest level of evidence, it plays an essential role in establishing an evidentiary framework. CR is most often employed to inform colleagues of rare or new cases, treatments and adverse events.<sup>7</sup> CR can potentially capture and describe the highly individualized processes of integrative health and medicine in a way that is not possible in randomized clinical trials, where interventions must be standardized. Therefore, CR is a fundamental and important part of KM clinical studies with regard

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to future research design.<sup>8</sup> The CAse REport (CARE) guidelines were developed to facilitate systematic reports of essential information in CR to improve the completeness and transparency.<sup>9</sup> The purpose of this study was to investigate the current status of case studies published in domestic and international academic journals that have been authored by KMDs who work in KM primary clinics in order to report new and interesting cases.

## 2. Methods

### 2.1. Study selection

#### 2.1.1. Types of studies

Included in this review were original case studies, (CR and CS) contributed by KMDs who practiced in Korean medical clinics. Articles were included if the clinically-based KMD was a first or contributing author. Excluded from the review were articles published by KMDs who worked exclusively in other KM settings, such as hospitals, public health centers, research institutes, or universities.

#### 2.1.2. Types of participants

The subjects of the reviewed studies included pediatric and adult patients. Study selection was not limited to reports of patients with specific diseases.

#### 2.1.3. Types of interventions

Important criteria in the CR and CS studies are narrative report or evidence table of demographic characteristics, symptoms, signs, diagnosis, treatment, and follow-up of an individual patient.

### 2.2. Data sources and searches

Seven electronic databases were searched, one in English and six in Korean: PubMed, Korea Citation Index (KCI), Korean Medical Database (KMbase), the National Assembly Library of Korea Dissertation Database, National Discovery for Science Leaders (NDSL), the Oriental Medicine Advanced Searching Integrated System (OASIS), and Research Information Sharing Service (RISS). Each database was searched for articles published from January 2000 through December 2018. The search terms consisted of three parts: "case study" (e.g., case report, case series), "Korean medicine doctor" (e.g., traditional Korean medicine doctor, oriental medicine doctor), and "Korean medicine clinic" (e.g., Korean medical clinic, oriental medicine clinic, oriental medical clinic, oriental clinic, herb clinic, *haniwon*, *han* medical clinic).

### 2.3. Data collection and analysis

Two independent reviewers (JHP and SYK) selected the studies according to study criteria and identified the articles to be included in the review by title and abstract. One reviewer (JHP) read the full text of the selected articles and extracted data using a standard data extraction form. Another reviewer (SYK) rechecked the data to ensure that they were obtained appropriately.

### 2.4. Data extraction and reporting quality

Extracted data were the number of cases per article, authorship order of KMD (first author or contributing author), types of academic journals, the number of articles published nationally or internationally by journal, and publication year. We classified the types of diseases in case reports according to the international statistical classification of disease and related health problems, 11th revision (ICD11).<sup>10</sup>

We evaluated the quality of CR and CS reporting based on CARE guidelines, specifically the CARE explanation and elaboration document, and the Korean version of the CARE checklist.<sup>11,12</sup> Two independent reviewers (JHP and SYK) evaluated the quality of the case studies on the 28 items of the CARE checklist. Any disagreement between the two reviewers was resolved by discussion until consensus. A "Y" indicated there were data corresponding to the item; an "N" indicated unclear or missing data regarding the item.

## 3. Results

The electronic database search yielded 2535 potentially relevant articles and 266 studies of CR and CS were included in the review (Fig. 1) (see supplementary online appendix 1).

KMDs published 195 articles (73.3%) as first authors. In particular, there were 125 articles (47.0%) in which the full authorship team consisted only of KMDs who worked in KM clinics. Additional authors were mainly KMD professors or researchers belonging to KM universities and hospitals. The included studies had a total of 847 cases, with an average of about 3 cases per article ranging from 1 to 38 cases.<sup>13</sup> Each case reported mainly Eastern and KM approaches to various chronic diseases.

The publication rate has increased sharply in recent years; there were 222 articles (83.5%) published since 2010, quadruple the number of articles published in the previous decade. Notably, there were 45 articles published in 2015 alone. Only 15 case studies with a clinic-based KMD author were published in international academic journals, and the first was in 2013 (Fig. 2).

The reviewed articles were published in 30 different academic journals: 24 domestic and six international journals. These academic journals were mainly related to KM. The most frequent publishers were the *Journal of Korean Medicine Ophthalmology and Otorhinolaryngology and Dermatology* with 48 articles (18.0%), and *Journal of Korean Medical Association of Clinical Sanghan-Geumgwae* with 39 articles (14.7%). In international journals, seven articles were published in *Explore*, and three were published in *Complementary Therapies in Medicine* (Table 1).

Of the 266 articles, 174 articles could be retrieved from KCI and Web of Science Core Collection and they were cited 485 times (mean 2.8 per article, ranging from 0 to 26 counts).

Based on ICD 11, the most commonly reported cases were diseases of the skin (346 cases; 40.9%). The primary skin diseases reported were psoriasis, acne vulgaris and scarring, seborrheic dermatitis, alopecia, and atopic dermatitis. Diseases of the genitourinary system were reported in 90 cases (10.6%) and included infertility, polycystic ovarian syndrome, and chronic prostatitis. The third most reported category was endocrine, nutritional or metabolic diseases (74 cases; 98.7%), with cases of obesity and non-insulin-dependent diabetes mellitus. No bias was found in the topics of published articles comparing all authors and authors who published more than two case study articles (Table 2). There were 19 cases (2.2%) in 9 articles reporting traditional medicine conditions, including six-meridian pattern identification/syndrome differentiation. There was one report of adverse reactions related to medications or treatments.<sup>14</sup>

Overall, case studies were documented consistently and in detail assessing by 28 item CARE checklist (mean = 75.3%) (Table 3). Unfortunately, there were 10 studies without the words "CR" or "CS" in the title and one study with no abstract. There are several checklist items which were not reported less than 50%. These included changes in intervention (33.8%), confirmation of informed consent (29.3%), adverse and unanticipated events (24.1%), sharing of the patient's perspective or experience (21.1%), and other items as listed in Table 3. After the CARE Guideline was published in 2013, the percentage of studies reporting informed consent increased

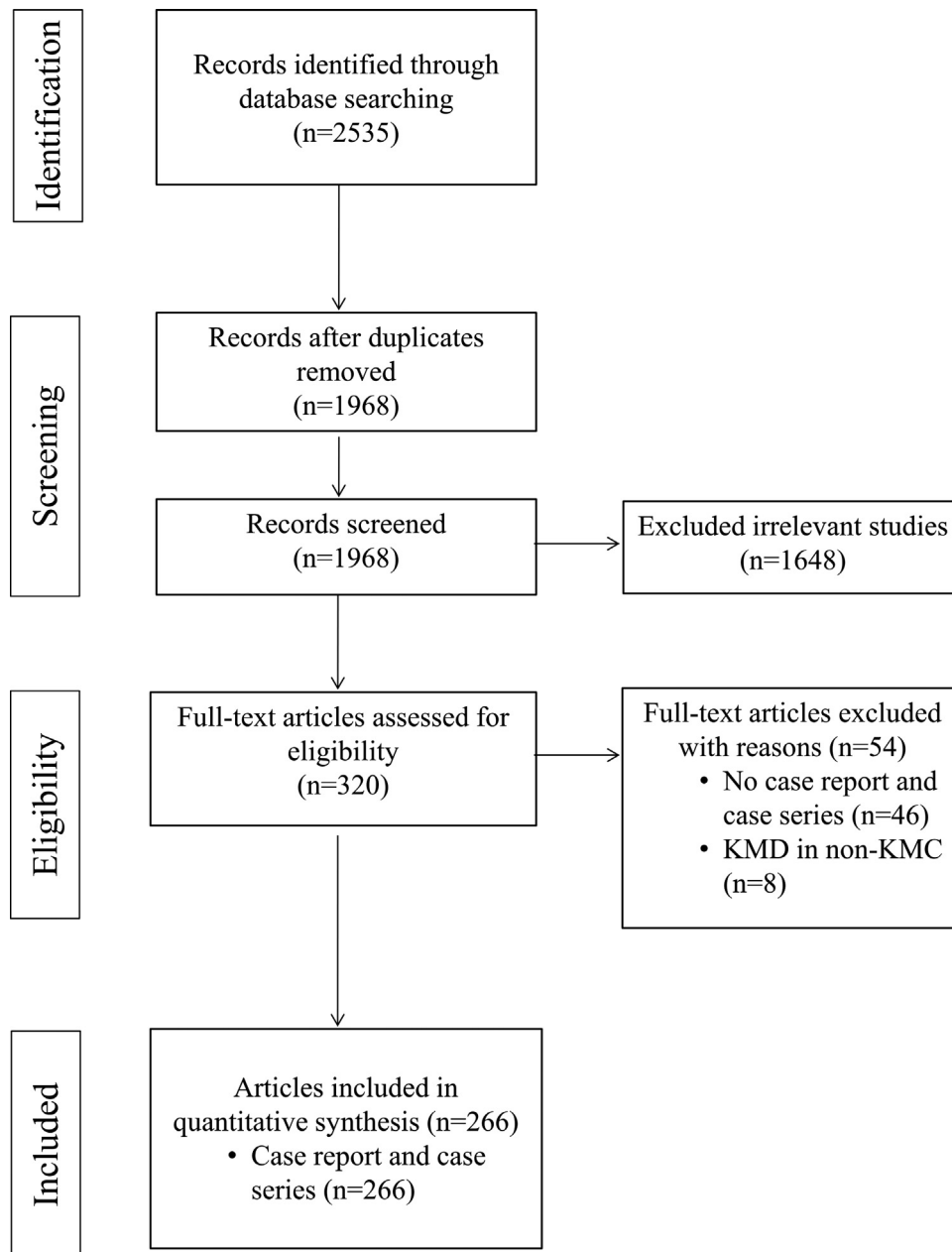


Fig. 1. Flow chart of the selection process.

from an average of 11.7% between 2000 and 2013 to 37.2% between 2014 and 2018 (ranging from 24.2% to 45.9%). The remaining items showed little difference in reporting over time.

#### 4. Discussion

We analyzed the CR and CS reported by KMD in primary clinics in quantitative and qualitative publication trends. A total of 266 CR and CS studies were published for 15 years and they included a total of 847 cases (about three cases per article). The most commonly reported cases were diseases of the skin (40.9%). Overall, the reporting quality of the reports was 75.3%.

We observed an upward trend in publication rates, with a steep increase since 2010. This quantitative increase fits with broader publication trends in medicine. The volume of CR publications increased by 45% on PubMed (from 42,439 to 61,689) and EMBASE with MEDLINE (from 49,918 to 72,388) between 2000 and 2010.<sup>15</sup>

The most frequently published journals were the *Journal of Korean Medicine Ophthalmology and Otorhinolaryngology and Dermatology* with 48 articles (18.0%), and the most common cases were diseases of the skin (77 articles; 28.9%, 346 cases; 40.9%). In a recent survey on KMDs' awareness and utilization of the CR, the most frequently requested topics by KMDs in clinical practice were diseases of the musculoskeletal system, followed by diseases of the digestive system; there were no requests for cases of skin disease.<sup>16</sup> This response seemed related to patient visits, as the highest insurance claims at KM clinics are for musculoskeletal system disease (53.7%), according to a 2016 herbal medicine health care utilization and consumption survey.<sup>3</sup> However, the most common reports were about chronic and intractable skin diseases such as psoriasis, acne, atopic dermatitis, warts, and seborrheic dermatitis. It seems that KMDs reported dermatology cases more often because the outcomes are more physically apparent with the goal of informing the public and other practitioners specializing in the treatment of skin diseases.<sup>17</sup>

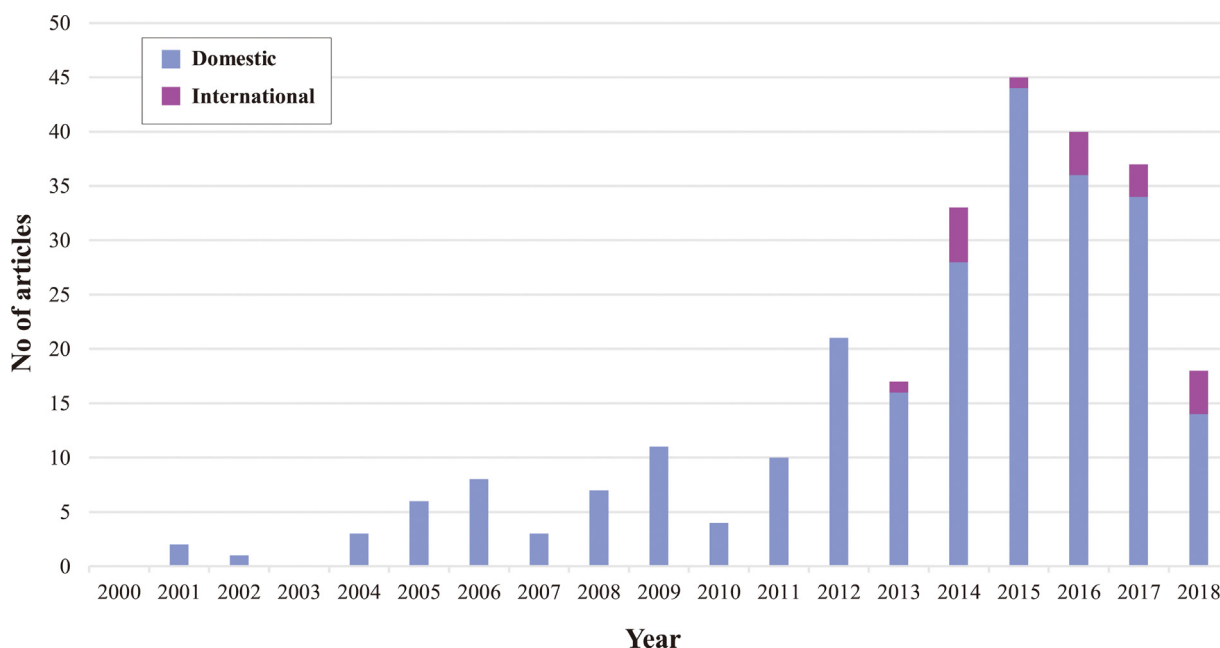


Fig. 2. Number of articles published by year.

**Table 1**  
Number of Articles Published According to Academic Journals

Name of academic journal	No. of articles (%) (n = 266)	
The Journal of Korean Medicine Ophthalmology and Otorhinolaryngology and Dermatology	48	(18.0%)
The Journal of Korean Medical Association of Clinical Sanghan-Geumgwe	39	(14.7%)
The Journal of Korean Obstetrics and Gynecology	24	(9.0%)
Journal of TMJ Balancing Medicine	17	(6.4%)
The Journal of Internal Korean medicine	16	(6.0%)
Journal of Korean Medicine for Obesity Research	15	(5.6%)
Journal of Korean Medicine	13	(4.9%)
Journal of Oriental Neuropsychiatry	11	(4.1%)
The Journal of Pediatrics of Korean Medicine	10	(3.8%)
Journal of Physiology & Pathology in Korean Medicine	9	(3.4%)
Journal of Acupuncture Research	8	(3.0%)
Journal of Korean Traditional Oncology	8	(3.0%)
Explore	7	(2.6%)
Korean Journal of Acupuncture	6	(2.3%)
The Journal of Korea CHUNA Manual Medicine for Spine and Nerves	6	(2.3%)
Herbal Formula Science	4	(1.5%)
Journal of Korean Medicine Rehabilitation	4	(1.5%)
Complementary Therapies in Medicine	3	(1.1%)
Journal of Acupuncture and Meridian Studies	3	(1.1%)
The Korea Journal of Herbology	3	(1.1%)
Journal of Pharmacopuncture	2	(0.4%)
Chinese Journal of Integrative Medicine	1	(0.4%)
Endocrinology, Diabetes & Metabolism Case Reports	1	(0.4%)
Integrative Cancer Therapies	1	(0.4%)
Journal of Korea Immuno-Yakchim Society	1	(0.4%)
Journal of Sasang Constitutional Medicine	1	(0.4%)
Journal of Ultrasound in Medicine	1	(0.4%)
Neuropsychiatric Disease and Treatment	1	(0.4%)
The Journal of Korean Academy of Orthopedic Manual Physical Therapy	1	(0.4%)
The Journal of Korean Medical History	1	(0.4%)
The Journal of the Korea Institute of Oriental Medical Diagnostics	1	(0.4%)

Overall the quality of reporting in the CR and CS based on the CARE Checklist was generally acceptable (75.3%) and consistent with previous studies.<sup>18,19</sup> However, notable findings were that intervention adherence and tolerability, and expression of patient perspectives or experiences in treatment were not often reported. The case studies are most effective if they contain various clinical experiences of patients in a vivid manner.<sup>18</sup> Thus, case studies are more authentic and valuable if the CR and CS are written considering CARE guidelines. Doing so should improve the overall quality

of CRs and ultimately may be a way to help health care providers use case study evidence more effectively in clinical and research settings.<sup>15</sup>

KMDs in clinical practice face significant challenges to publishing case studies in international academic journals. First, clinical KMDs need a CR activation system. Such a KM educational network could help to increase both the quantity and quality of CRs through education with regard to obtaining informed consent from the patients before publication and selecting several important

**Table 2**  
Classification of Cases Diseases According to International Statistical Classification of Disease and Related Health Problems, 11th Revision (ICD11)

International statistical classification of disease and related health problems, 11th revision (ICD11)	All author (n = 266)				Authors published more than two articles (n = 42)			
	No. of articles (%) (n = 266)		No. of cases (%) (n = 847)		No. of articles (%) (n = 125)		No. of cases (%) (n = 410)	
Diseases of the skin	77	(28.9%)	346	(40.9%)	38	(30.4%)	179	(43.7%)
Diseases of the genitourinary system	34	(12.8%)	90	(10.6%)	17	(13.6%)	46	(11.2%)
Diseases of the musculoskeletal system or connective tissue	31	(11.7%)	66	(7.8%)	13	(10.4%)	16	(3.9%)
Endocrine, nutritional or metabolic diseases	23	(8.6%)	74	(8.7%)	12	(9.6%)	31	(7.6%)
Mental, behavioral or neurodevelopmental disorders	18	(6.8%)	25	(3.0%)	9	(7.2%)	12	(2.9%)
Diseases of the nervous system	17	(6.4%)	52	(6.1%)	4	(3.2%)	11	(2.7%)
Diseases of the digestive system	10	(3.8%)	57	(6.7%)	6	(4.8%)	48	(11.7%)
Neoplasms	9	(3.4%)	12	(1.4%)	4	(3.2%)	5	(1.2%)
Symptoms, signs or clinical findings, not elsewhere classified	9	(3.4%)	15	(1.8%)	5	(4.0%)	9	(2.2%)
Traditional Medicine conditions – Module I	9	(3.4%)	19	(2.2%)	6	(4.8%)	10	(2.4%)
Diseases of the respiratory system	6	(2.3%)	15	(1.8%)	2	(1.6%)	5	(1.2%)
Pregnancy, childbirth or the puerperium	4	(1.5%)	10	(1.2%)	2	(1.6%)	6	(1.5%)
Certain infectious or parasitic diseases	3	(1.1%)	5	(0.6%)	1	(0.8%)	1	(0.2%)
Diseases of the blood or blood-forming organs	3	(1.1%)	5	(0.6%)	1	(0.8%)	3	(0.7%)
Diseases of the circulatory system	3	(1.1%)	25	(3.0%)	1	(0.8%)	22	(5.4%)
Diseases of the ear or mastoid process	3	(1.1%)	4	(0.5%)	1	(0.8%)	1	(0.2%)
Diseases of the visual system	2	(0.8%)	7	(0.8%)	1	(0.8%)	1	(0.2%)
Injury, poisoning or certain other consequences of external causes	2	(0.8%)	4	(0.5%)	2	(1.6%)	4	(1.0%)
Developmental anomalies	1	(0.4%)	3	(0.4%)	0	(0.0%)	0	(0.0%)
Sleep-wake disorders	1	(0.4%)	12	(1.4%)	0	(0.0%)	0	(0.0%)
Adverse events	1	(0.4%)	1	(0.1%)	0	(0.0%)	0	(0.0%)

**Table 3**  
Percentage of Case Reports and Case Series Reporting Based on CARE Checklist

Section	Item number	Item description	No. of reporting %(n/N)	
Title	1	The words “case report” (or “case study”) should be in the title along with phenomenon of greatest interest (e.g., symptom, diagnosis, test, intervention)	256/266	(96.2%)
Keywords	2	The key elements of this case in 2–5 words.	265/266	(99.6%)
Abstract	3a	Introduction-What does this case add?	266/266	(100.0%)
	3b	Case presentation: - The main symptoms of the patient - The main clinical findings - The main diagnoses and interventions - The main outcomes	266/266	(100.0%)
Introduction	3c	Conclusion-What were the main “take-away” lessons from this case?	266/266	(100.0%)
	4	Brief background summary of the case referencing the relevant medical literature.	266/266	(100.0%)
Patient information	5a	Demographic information of the patient (age, gender, ethnicity, occupation)	266/266	(100.0%)
	5b	Main symptoms of the patient (his or her chief complaints)	266/266	(100.0%)
	5c	Medical, family, and psychosocial history-including diet, lifestyle, and genetic information whenever possible and details about relevant comorbidities and past interventions and their outcomes	263/266	(98.9%)
Clinical findings	6	Describe the relevant physical examination (PE) findings	263/266	(98.9%)
Timeline	7	Depict important dates and times in the case (table or figure)	230/266	(86.5%)
Diagnostic assessment	8a	Diagnostic methods (e.g., PE, laboratory testing, imaging, questionnaires)	264/266	(99.2%)
	8b	Diagnostic challenges (e.g., financial, language/cultural)	2/266	(0.8%)
	8c	Diagnostic reasoning including other diagnoses considered	17/266	(6.4%)
	8d	Prognostic characteristics (e.g., staging) where applicable	19/266	(7.1%)
Therapeutic intervention	9a	Types of intervention (e.g., pharmacologic, surgical, preventive, self-care)	266/266	(100.0%)
	9b	Administration (e.g., dosage, strength, duration)	266/266	(100.0%)
	9c	Changes in intervention (with rationale)	90/266	(33.8%)
Follow-up and outcomes	10a	Clinician and patient-assessed outcomes	266/266	(100.0%)
	10b	Important follow-up test results (positive or negative)	247/266	(92.9%)
	10c	Intervention adherence and tolerability (and how this was assessed)	37/266	(13.9%)
	10d	Adverse and unanticipated events	64/266	(24.1%)
Discussion	11a	Strengths and limitations of the management of this case	266/266	(100.0%)
	11b	Relevant medical literature	266/266	(100.0%)
	11c	Rationale for conclusions (including assessments of cause and effect)	266/266	(100.0%)
	11d	Main “take-away” lessons of this case report	266/266	(100.0%)
Patient perspective	12	The patient should share their perspective or experience whenever possible.	56/266	(21.1%)
Informed consent	13	Did the patient give informed consent? Please provide if requested.	78/266	(29.3%)

clinical outcomes of major diseases of a clinic in advance using a questionnaire or medical device. Second, due to their ease of use in clinical practice and in order to enhance the clinical management of individual patients, the development of Patient Reported Outcome Measures that have been validated within the Korean population and language is required.<sup>20</sup>

This study is limited in that it does not fully represent the quantity or quality of CR and CS reported by all KMDs, as it focused on reports from clinical KMDs, rather than those in university or hospital settings.

To produce practical clinical research and new hypotheses for disease diagnosis and treatment, case study reports by KMDs working in clinical settings should continue to be promoted and published. When promoting case reports in KM clinics, there is a need for organic cooperation in case study training between the association of KM society, various KM-related societies, and KMDs.

#### Author contributions

Conceptualization: JHP, THK, SHL, and JHL. Methodology: JHP, THK, SHL, and JHL. Formal Analysis: JHP and SYK. Writing – Original Draft: JHP and SYK. Writing – Review & Editing: JHP, SYK, and JHL. Supervision: THK, SHL, and JHL.

#### Conflict of interest

The authors declare no conflict of interest.

#### Funding

This study was supported by the Korea Institute of Oriental Medicine (KSN2013210, KSN2012110).

#### Ethical statement

No ethical approval was required for this manuscript as this study did not involve human subjects or laboratory animals.

#### Data availability

Data associated with this article will be provided upon request.

#### Supplementary material

Disease specific outcomes according to International statistical classification of disease and related health problems, 11th revision

(ICD11), can be found in the online version, at [doi:10.1016/j.imr.2020.100417](https://doi.org/10.1016/j.imr.2020.100417).

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