Case Report

A Trend Analysis of Case Reports and Case Series on Hwa-byung in Korea

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Objectives: This study aimed to provide a basis for treatment of Hwa-byung, a mental disorder frequently found among Koreans, by analysing published case reports and case series.

Methods: In June 2015, a literature search for case reports and case series describing interventions for Hwa-byung was conducted in 7 databases for research publications in Korea, using Korean and English terms.

Results: Thirty-two papers, reporting 439 cases of Hwa-byung, met the inclusion criteria. Since the first case report on Hwa-byung in 1996, case reports were continuously published until 2012. A total of 22 interventions were described, of which herbal medicine (71.9%), acupuncture (65.6%), and moxibustion (34.4%) were the most frequently described interventions. Twenty-five papers reported patterns, for which liver qi depression (28%) was most frequently used. A total of 48 outcome measures were used in 32 papers, of which Beck Depression Index (46.9%) and Symptom change (43.8%) were used in at least 10 papers.

Conclusions: Since only 32 case reports/case series have been published on Hwa-byung in Korea, a strong basis for recommending standardized treatments is lacking. Therefore, a sufficient number of clinical studies, in particular randomized clinical trials (RCTs), are warranted to provide a clinical basis for treatment of Hwa-byung.

Key Words : hwa-byung, anger syndrome, korean medicine

Introduction

According to the “Diagnostic and Statistical Manual of Mental Disorders-IV” published by the American Psychiatric Association, Hwa-byung is an anger syndrome—a Korean folk syndrome, caused by suppression of anger¹⁾. In addition, Hwa-byung has been mentioned as a disease in oriental medicine in the “Korean Standard Classification of Diseases”²⁾. Taken together, these facts indicate that Hwa-byung

has been recognized as a disease found commonly in Koreans.

Although Hwa-byung is usually explained in relation to Korean culture that is suppressive and discourages one from expressing oneself, it is not limited to Koreans. As a result of various studies investigating this disease, Hwa-byung is currently considered a universal disease caused by uncontrollable anger or long-term suppression of anger³⁾. Hwa-byung is also called Wool-hwabyung, in which the anger

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pent-up inside an individual is expressed as wrath. Hwa-byung patients experience symptoms including oppression in the chest, upper body heat, anxiety, palpitations, depression, and flush face; long-term patients tend to be more prone to depression⁴⁾.

The prevalence of Hwa-byung was 4.1% in Korea, and it was more prevalent among middle-aged people and women⁵⁻⁷⁾. In addition, a study reported that Hwa-byung was a disease distinct from psychiatric disorders such as depression and anxiety, and 15% of patients with Hwa-byung were not classified under other psychiatric disorders⁸⁾.

Different kinds of studies have been carried out in Korea to study Hwa-byung, e.g. literature reviews to investigate its concept⁹⁻¹⁰⁾, clinical studies to investigate characteristics of patients with Hwa-byung¹¹⁻¹²⁾, studies for pattern standardization¹³⁻¹⁴⁾, and studies on development of standard outcome measures¹⁵⁻¹⁶⁾. In contrast, there have been few studies outside Korea, and most of the papers published in English were reviews by Korean doctors or Korean medicine doctors to introduce the concept of Hwa-byung¹⁷⁾, clinical studies conducted on patients with Hwa-byung¹⁸⁾, and comparative studies between Hwa-byung and other diseases¹⁹⁾.

Therefore, the aim of the present study was to investigate the current situation of case reports and case series among clinical studies papers on Hwa-byung published in Korea, and analyse outcome measures, interventions, and patterns for Hwa-byung. This would eventually aid in preparing a basis for standardization of diagnosis and treatment of Hwa-byung.

Methods

1. Data sources

In order to investigate Korean papers on Hwa-byung, we selected the following 7 databases in accordance with “NECA’s guidance for undertaking systematic

reviews and meta-analyses for intervention”²⁰⁾: Research Information Service System (RISS), Korean Medical Database, Korea Citation Index (KCI), Korea Med, National Discovery for Science Leaders (NDSL), National Assembly Library and DBpia. The following search terms were used: ‘Wool-hwabyung (울화병)’, ‘Hwabyung(화병)’, ‘Hwa byung’, ‘Anger Syndrome’ and ‘Anger Disorder’, both in Korean and English. The data for analyses were extracted in June 2015, with no limits on search period.

2. Study selection

We selected case reports and case series describing interventions among papers on clinical studies of Hwa-byung. News items, letters, randomized clinical trials (RCTs), controlled clinical trials (CCTs), qualitative studies, reviews, surveys, and interviews were excluded. In addition, case reports and case series not discussing interventions were also excluded (Fig. 1).

3. Data extraction

Two authors (Chang-Hyun Han and Soo-Hyun Sung) selected papers meeting the inclusion criteria, which were then classified into categories. The two authors independently extracted and integrated information about authors, year of publication, age, gender, number of patients, intervention, outcome measure, conclusion, and pattern. Disagreements between the two authors were resolved by discussion until a consensus was reached.

Results

1. Search Process and Result

As a result of the initial searches, 14241 papers were found, among which duplicate publications, papers not conforming to a basic paper format (without abstracts or references), and papers not related to Hwa-byung were excluded, resulting in a

Fig. 1. Flowchart of the study selection process

CCTs: Controlled Clinical Trials; RCTs: Randomized Clinical Trials.

total of 188 papers. Of them, a total of 32 papers (19 case reports and 13 case series), describing 439 cases of Hwa-byung, met the inclusion criteria. The characteristics of the selected case reports and case series are presented in Tables 1 and 2. Names of acupuncture points were written based on the “Standard Acupuncture Nomenclature”, names of prescriptions were based on the “Compilation of Formulas and Medicinal Addendum”, and names of patterns and symptoms were based on the “WHO International Standard Terminologies on Traditional

Medicine in the Western Pacific Region” and the “Standard Terminologies on Korean Medicine”.

2. Number of papers and cases by year.

The first case report was published in 1996; there was no case report or case series published after 2013. Four case reports and 4 case series—the highest numbers—were published in 2005 and 2012, respectively. The maximum number of cases reported in a year was 147 in 2006 (Fig. 2).

Table 1. Characteristics of the published case reports on Hwa-byung

First author (Year)	Age/gender	Intervention			Korean medicine pattern	Outcome measures	Conclusion
		Acupuncture	Herbal medicine	Moxibustion			
Lee SG (1996)	34/F	CV17, CV12, CV10, ST25, LI4, K11, GV20, GV24, GB8, EX-HN5, ST8	1. Bunsimgi-eum + Hoelen cum Radix 2. Hyangsapyeong-wisan 3. Yanggyeoksanhwatang	CV3, CV4, CV6	1. Qi depression	1. symptom change	Palpitations, fearful throbbing, and upper body heat significantly improved after treatment, whereas lower body cold remained same.
		LR3, LI4, HT8, HT3, ST36, SP6, PC6, GV17, GV20, LI11	1. Chungsimjilhwatang 2. Gami-ondamtang	CV12, CV4, ST36, SP6, LR3, GB34, SP9	1. Depression pattern 2. Yin deficiency with effulgent fire	1. symptom change 2. DITI 3. TCD 4. Autonomic nervous function test	Oppression in the chest, upper body heat, anxiety, palpitations, dyspnea, and dyspepsia disappeared and lower body dysesthesia was improved. DITI, TCD, and autonomic nervous function test were not measured after treatment.
Kim RS (2001)	51/F	LR1, HT9, KI10, HT3, GV20, CV17, CV13, CV12, ST25, LI4, LR3, ST36	1. Bunsimgi-eum-gami 2. Hyangsapyeong-wisan	CV10, CV12, CV13	1. Qi depression 2. Dietary stagnation	1. symptom change 2. KI 3. Hwa-byung scale	KI before treatment was 72 points, but it was not measured after treatment. Paresthesia of the lower limb, headache, stiffness of the neck, palpitations, dyspepsia, and oedema all improved.
Lee JI (2004)	36/M	LU8, SP3, KI3, KI10, LR1, LR2, GB41, BI66	1. Bangpungdongseongsan 2. Gwibitang 3. Gyogamdan	CV12, CV4	1. Depressed liver qi transforming into fire 2. Qi deficiency dampness-phlegm	1. MMPI 2. HBDIS 3. VAS	Headache significantly improved from 10 to 0 in VAS measurement. Patients who used to have a propensity for violence became positively changed in attitudes toward families. MMPI and HBDIS were not measured again after treatment.
Jung WK (2005)	53/F	n.r.	1. Cheongsimyeonjatang	n.r.	1. Taeum person interior heat disease induced by the affected liver heat 2. Middle qi syndrome	1. MMPI 2. HBDIS	In general, Hwa-byung symptoms were improved on the HBDIS scale. MMPI was not measured after treatment.
Kim SH (2005)	47/F	LR3, GB34, ST36, GB39, GB41, LI4, CV12, CV4, ST25, CV17, GB20, GV20, EX-HN5	1. Ssanghwatang combine with Jagyaganchotang 2. Bunsimgi-eum-gami 3. Gwibitang combine with Jagyaganchotang 4. Jagyaganchotang	n.r.	1. Liver depression and spleen deficiency 2. Heart blood deficiency	1. MMPI 2. BDI 3. HRV 4. symptom change	Paresthesia of lower limb, headache, palpitations, oppression in the chest, and upper body heat symptoms were not improved. MMPI, BDI and HRV were not measured again after treatment.
Kim JW (2005)	48/F	GV20, CV17, ST25, LI4, LR3, CV12, ST36	1. Palmulgunjatang	CV4, CV12	1. Dual deficiency of qi and blood 2. Qi depression	1. symptom change	Plum-pit qi, upper body heat, palpitations, and sleep disorder symptoms were generally improved.
Kim YW (2005)	54/F	n.r.	1. Gami-yukgunjatang 2. Gwakhyangjeongsan 3. Sibimigwanjungtang 4. Hyanghuijapalmultang	n.r.	1. Soeum person stomach cold affection interior cold disease	1. VAS	The VAS for vertigo, abdominal palpitation, oppression in the chest and insomnia were significantly decreased

First author (Year)	Age/gender	Intervention				Korean medicine pattern	Outcome measures	Conclusion
		Acupuncture	Herbal medicine	Moxibustion	Etc.			
Kim HS (2006)	67/F	SI2, BL66, SI3, GB41, LR8, LU8, LR4, ST35, ST36, SP6, LR3, EX-LE4, SP10, HT8, PC8, CV12, ST25, GV20, EX-HN3	1. Gami-soyosan 2. Pyeongwisang-gagam	n.r.	n.r.	1. Liver qi depression 2. Spleen-stomach disharmony	1. symptom change	Surging feeling, headache, dizziness, depression, and flush face symptoms that Hwa-byung patients complained of mostly disappeared.
		LU8, LR4, HT8, LR2, GV20, GV24, CV17, PC6, LU4, LR3, LR2, ST36, GB41	1. Sihoeokgantang 2. Ssanghwatang 3. Gwakhyangjeonggisang	n.r.	1. Cupping	1. Qi depression	1. Blood test and urinalysis 2. GAF scale 3. symptom change	Most symptoms disappeared after treatment. GAF Scale was improved from 35 to 75, and patients have been able to have a daily life.
Kim JH (2007)	51/F	GB41, TE3, TE2, BL66	1. Hwanggi-gyejjang	CV4, CV12	1. Cupping 2. Bee venom acupuncture 3. Tuna 4. Counseling and persuading therapy	1. Yang collapse early syndrome of soem person	1. MMPI 2. symptom change	Plum-pit qi and oppression in the chest almost disappeared, and stiffness of the neck was significantly improved. MMPI was not measured again after treatment.
Park SH (2008)	33/F	LU8, LR4, HT8, LR2, SI5, LI5, BL66, LI2, HT8, SP2, LR1, SP1, BL66, GB43, LI1, GB44, LR1, HT9, KI10, HT3, LI1, BL67, BL40, ST36, PC6, CV17	1. Ondam-gwibitang 2. Cheonggansoyosan-gami 3. Gagangwibitang-gami	CV12	1. Aromatherapy 2. Meditation 3. Liver depression	1. Liver-gallbladder depression 2. Dual deficiency of the heart-spleen 3. Liver depression	1. BDI 2. SDS 3. SCL-90-R 4. MMPI-2 3. symptom change	BDI decreased from 29 to 19 points and SDS decreased from 62 to 52 points. Sleep Disorder, paresthesia, alternating chills and fever, headache, and palpitations symptoms disappeared mostly. SCL-90-R and MMPI were not remeasured after treatment.
		n.r.	n.r.	n.r.	1. Music therapy 2. Breathing 3. Relaxation exercise	n.r.	1. Change in range of motion 2. Change in numbers of question and answer 3. Change in length of continuous playing musical instrument 4. Change in numbers of eye contacts 5. Change in verbal responses 6. Change in response time	After treatment. 1. Range of motion expanded. 2. Numbers of question and answer increased. 3. Length of playing musical instrument gradually increased. 4. Numbers of eye contacts with colleagues and therapists increased. 5. Positive responses increased, while negative ones decreased.
Park MS (2008)	67/F	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.

First author (Year)	Age/gender	Intervention			Korean medicine pattern	Outcome measures	Conclusion
		Acupuncture	Herbal medicine	Moxibustion			
Hwang JH (2009)	F/51	CV17, CV12, ST25, LI4, ST36, GV20, KI1, ST1, ST2, GB14, EX-HN4, BL2	1. Cheongsimondamtang 2. Gami-boiktang	n.r.	1. Heart deficiency with timidity 2. Sunken middle qi	1. MMPI 2. Blood test and urinalysis 3. BDI 4. symptom change 5. ECG	Characteristic symptoms of Blepharoptosis including bilateral ptosis, facial pain, and facial numbness and characteristic symptoms of Hwa-byung including chest discomfort and anxiety disappeared mostly. MMPI, Blood test and urinalysis, BDI, and ECG were not measured after treatment.
Park SH (2009)	48/F	KI10, LR8, LU8, LR4, LU8, KI7, SP3, KI3, PC6, CV17	1. Cheonggansoyosan-gami 2. Isontang-gami	CV12	1. Liver-gallbladder depression 2. Kidney yin yang deficiency	1. Lab test 2. BDI 3. SDS 4. KI 5. MRS 6. SCL-90-R	After treatment, the chief complaints and accompanying symptoms were subsided and improved. The scores of BDI, SDS, KI and MRS were decreased. Most indices of SCL-90-R were improved.
Park SH (2010)	41/F	LR1, HT9, KI10, HT3, KI10, LR8, LU8, LR4, PC6, CV17	1. Wolguk-ondamtang 2. Bungbositang	CV12	1. Heart deficiency with timidity	1. MMPI-2 2. SCL-90-R 3. BDI 4. SDS 5. STAI	After treatment, the chief complaints and accompanying symptoms were subsided and improved. The scores of BDI, SDS and STAI were decreased. MMPI-2 and SCL-90-R were not remeasured after treatment.
An TH (2011)	26/F	HT8, SP2, LR1, SP1, BL66, GB43, LI1, GB44, LR3, LI4, CV13, CV12, CV10	1. Hwangnyeonhaedoktang combine with sihosogansan 2. Hyangsa-yukgunjatang	CV4	1. Liver qi depression 2. Liver fire flaming upward 3. Depressed qi transforming into fire 4. Spleen qi deficiency 5. Spleen deficiency engendering phlegm	1. HBDIS 2. symptom change 3. BDI 4. Diagnosis criteria for binge eating of DSM-IV	BDI significantly decreased from 32 to 17, and most complained symptoms decreased.
Ko IS (2012)	42/M	HT7, PC6, SP6, KI3	1. Hwangnyeon-agyotang 2. Danggi-yukhwangtang - Phellodendri Cortex + Paeoniae Radix Alba 3. Hwanggeumtang	LI11, LI10, LI4, TE3, ST36, LR3	1. Heart-kidney non-interaction 2. Spleen deficiency engendering phlegm	1. VAS 2. IOMEBB 3. BDI 4. BAI 5. PSQI 6. SCL-90-R 7. EEG	All EEG was normal before and after treatment and all scores of VAS, IOMEBB, BDI, BAI, PSQI, and SCL-90-R decreased, showing trends of improvement.
Shin HE (2012)	18/F	n.r.	n.r.	n.r.	1. Art therapy	1. STAXI 2. BDI 3. SCT 4. DAS test	STAXI and BDI scores were generally improved after treatment, and anger and depression were found to be reduced through SCT and DAS tests.

n.r.: not reported; DTI: Digital Infrared Thermal Imaging; TOD: Trans Cranial Doppler; KI: Kupperman Index; MMPI: Minnesota Multiphasic Personality Inventory; HBDIS: Hwa-Byung Diagnostic Interview Schedule; VAS: Visual Analogue Scale; BDI: Beck Depression Index; HRV: Heart Rate Variability; GAF scale: Global Assessment of Functioning; SDS: Zung's self rating Depression Scale; SCL-90-R: Symptom Checklist-90-Revision; ECG: Electrocardiogram; MRS: Menopause Rating Scale; STAI: State-Trait Anxiety Inventory; DSM: Diagnostic and Statistical Manual of Mental Disorders; IOMEBB: Instrument of Oriental Medical Evaluation for Hwa-Byung; BAI: Beck Anxiety Inventory; PSQI: Pittsburgh Sleep Quality Index; EEG: Electroencephalogram; STAXI: State-Trait Anger Expression Inventory; SCT: Sentence Completion Test; DAS test: Draw A Story Test.

Table 2. Characteristics of the published case series on Hwa-byung

First Author (Year)	Number of cases	Age/gender	Intervention				Korean medicine pattern	Outcome measures	Conclusion
			Acupuncture	Herbal medicine	Moxibustion	Etc.			
Kim JW (1998)	69	n.r./ n.r.	CV17, CV12, ST25	1. Bunsimgi-eum-gami	n.r.	n.r.	1. Qi depression	1. symptom change	For pain changes of CV17, 17 patients had no improvement, while 57 patients showed improvement. For changes of Hwa-byung symptoms, 21 patients had no improvement, while 48 patients showed improvement.
Kim MJ (1999)	29	n.r./ F28, M1	n.r.	1. Bunsimgi-eum 2. Seonghyangjeonggisan 3. Cheonggansoyosan 4. So-yosan 5. Sihosogansan 6. Haeulbosintang 7. Gwibitang 8. Ondamtang-gami 9. Gwibi-ondamtang 10. Ikgi-bohyeollang 11. Samul-ansintang 12. Samul-gwibitang	n.r.	1. Herbal acupuncture 2. Aroma therapy 3. Meditation	1. Qi depression 2. Liver qi depression 3. Heart deficiency with timidity 4. Nutrient and blood deficiency	1. symptom change	Of 29 Hwa-byung patients, 1 patient had a great improvement, 24 had good improvements, and the remaining 4 had no change.
Lim JH (2000)	26	30-69/ F26	CV17, CV12, CV10, ST25, LI4	1. Bunsimgi-eum-gami 2. Yongnoesohabwon	n.r.	n.r.	1. Depressed qi transforming into fire	1. GARS 2. VAS	3 out of 8 items in GARS showed significant reduction after treatment, and all of 4 symptoms including upper body heat, palpitations, flush face, and anger significantly decreased in VAS measurements.
Park YJ (2004)	16	29-62/ F16	n.r.	n.r.	n.r.	1. Hwa-byung program	n.r.	1. STAXI 2. BDI 3. STAI 4. Symptom change 5. Measurement of pain sensitivity by Algometer	After treatment, 1. STAXI showed no significant change. 2. BDI significantly decreased. 3. STAI significantly decreased. 4. Hwa-byung symptoms significantly decreased. 5. Pain sensitivity decreased, but there was no significant change.
Bae EJ (2006)	25	44.3±10.2/ F30, M7	n.r.	1. Yeoldahansotang	n.r.	n.r.	1. Liver qi depression 2. Depressed liver qi transforming into fire	1. Hwa-byung scale 2. QSCC II 3. Diagnostic scoring system for the condition of excess, deficiency, Yin and Yang 2. Hepatorenal function test	After treatment, the Symptom scale of Hwa-byung was improved significantly. There was significantly more effectiveness of improving Hwa-byung in excess group than in deficiency group. There was neither significant difference in improvement of Hwa-byung between Yin and Yang group, nor among groups resulting from QSCC II. Comparison of Hepatorenal function test results between before and after treatment found no significant difference.

First Author (Year)	Number of cases	Age/ gender	Intervention				Korean medicine pattern	Outcome measures	Conclusion
			Acupuncture	Herbal medicine	Moxibustion	Etc.			
Jeong JY (2006)	120	n.r./F55, M65	n.r.	n.r.	n.r.	1. Meditation program	n.r.	1. Hwa-byung scale 2. SCL-90-R 3. Multidimensional coping scale 4. MAI 5. Self esteem scale 6. Insight level 7. Self reporting classification scale questionnaire	After treatment, 1. Both Hwa-byung group and non-Hwabyung group had significant reductions in Hwa-byung scale. 2. Both Hwa-byung group and non-Hwabyung group had significant reductions in SCL-90-R. 3. The Hwa-byung group showed significant differences in 'positive interpretation' and 'passive withdrawal', and the non-hwabyung group in 'emotional expression', 'positive interpretation', 'emotional social support seeking', 'accommodation', 'obstinacy', 'active coping' and 'passive withdrawal' 4. The Hwa-byung group showed significant differences in 'anger in', 'range of anger-eliciting situations', 'hostile outlook', and the non-hwabyung group in 'mode of anger expression', 'range of anger-eliciting situations', 'anger in', 'hostile outlook', 'anger out'
Park SJ (2007)	6	39-55/ n.r.	n.r.	n.r.	n.r.	1. Music therapy	n.r.	1. HBDIS 2. BDI 3. STAI 4. STAXI	BDIS and BDI significantly decreased after treatment, whereas STAI and STAXI showed no significant change.
Min SK (2009)	89	18-65/ F73, M16	n.r.	n.r.	n.r.	1. Western medicine Paroxetine HCL	n.r.	1. Hwa-byung scale 2. HAM-D 3. STAXI	After treatment, All items in Hwa-byung scale and HAM-D scores significantly decreased and 'State anger', 'Trait anger', and 'Anger control' significantly decreased based on STAXI scores.
Park DM (2011)	3	n.r./ F3	1. Case 1 KI10, LR8, LU8, LR4 2. Case 2 LU8, LR4, HT8, LR2 3. Case 3 KI10, LR8, LU8, LR4	1. Case 1 1) Ja-eunganghwatang 2. Case 2 1) Ukgansan combine with Hwangnyeonhaedokia 3. Case 3 1) Ja-eunganghwatang	n.r.	1. Case 1 1) Meditation 2. Case 2 1) Meditation 3. Case 3 1) Meditation	1. Heart-kidney non-interaction 2. Liver fire flaming upward 3. Heart-kidney non-interaction	1. IOMEHB 2. SCL-90-R 3. BDI 4. STAXI 5. STAI	All 3 cases showed remarkable improvements in BDI and IOMEHB and tended to improve in STAI and STAXI.

First Author (Year)	Number of cases	Age/gender	Intervention				Korean medicine pattern	Outcome measures	Conclusion
			Acupuncture	Herbal medicine	Moxibustion	Etc.			
Ahn HS (2012)	2	70-74/ F1, M1	n.r.	n.r.	n.r.	1. EFT	n.r.	1. PHB scale 2. BDI 3. KMS scale	HB scale and BDI decreased in general after EFT treatment, but KMS scale increased. These indicate that EFT treatment is effective in relieving symptoms related to Hwa-byung and depression.
Hong SS (2012)	16	19-65/ n.r.	n.r.	n.r.	n.r.	1. Forest therapy program	1. Liver qi depression 2. Liver fire flaming upward 3. Heart-kidney non-interaction 4. Dual deficiency of qi and blood 5. Depressed gallbladder with harassing phlegm	1. IOMEHB 2. BDI 3. STAXI 4. STAI 5. WHOQOL-BREF 6. HRV	Forest therapy program significantly reduced core symptoms of Hwa-byung on IOMEHB, WHOQOL, BDI, STAI, and STAXI were generally improved though there was no significant difference. There was no distinct change in HRV.
Jung DJ (2012)	15	30-69/ F11, M4	SP6, EX-HN3, CV17	n.r.	n.r.	n.r.	1. Liver qi depression 2. Depressed qi transforming into fire 3. Heart-kidney non-interaction 4. Yin deficiency with effulgent fire	1. HBDIS 2. BDI 3. STAI 4. VAS 5. HRV	After treatment, HBDIS, STAI, and VAS significantly decreased, but BDI and HRV were not significantly changed.
Ryu HS (2012)	3	29-66/ F2, M1	1. Case 1 HT8, LR2, SI3, BL62 2. Case 2 HT8, LR2, PC6, SP4, CV17 3. Case 3 HT8, KI10, LR2, SI3, BL62	1. Case 1 Puerariae Radix, Scutellariae Radix, Paeoniae Radix, Glycyrrhizae Radix 2. Case 2 Pinelliae Tuber, Trichosanthis Semen, Zingiberis Rhizoma 3. Case 3 Crudus, Evodiae Fructus Gardeniae Fructus, Glycyrrhizae Radix	n.r.	1. Case 1 Vomiting therapy 2. Case 2 Vomiting therapy 3. Case 3 Vomiting therapy	1. Case 1 1) Liver qi depression 2) Liver fire flaming upward 2. Case 2 1) Liver qi depression 2) Depressed gallbladder with harassing phlegm 3. Case 3 1) Liver qi depression 2) Liver fire flaming upward	1. VAS 2. Scott scale 3. IOMEHB 4. BDI 5. STAI	After treatment, the chief complaint and other symptoms of Hwa-byung have improved. The scores of VAS for hemifacial spasm, Scott, IOMEHB, BDI and STAI were decreased.

n.r.: not reported; GARS: Global Assessment of Recent Stress; VAS: Visual Analogue Scale; STAXI: State-Trait Anger Expression Inventory; BDI: Beck Depression Index; STAI: State-Trait Anxiety Inventory; QSCC: Questionnaire Sasang Constitution Classification; SCL-90-R: Symptom Checklist-90-Revision; MAI: Multidimensional Anger Inventory; HBDIS: Hwa-Byung Diagnostic Interview Schedule; HAM-D: Hamilton Depression Scale; IOMEHB: Instrument of Oriental Medical Evaluation for Hwa-Byung; PHB scale: Preliminary Hwa-Byung Scale; KMS scale: Kansas Marital Satisfaction; WHOQOL-BREF: WHO Quality Abbreviated Version; HRV: Heart Rate Variability.

Fig. 2. Trend of papers and cases of Hwa-byung by year

3. Interventions.

A total of 22 interventions were described in the 32 papers, of which herbal medicine, acupuncture, and moxibustion were described in 23, 21, and 11 papers, respectively. Interventions described in at least 2 papers are presented in Table 3.

Table 3. Interventions reported in case reports and case series on Hwa-byung.

Intervention	Number of papers
Herbal medicine	23(71.9%)
Acupuncture	21(65.6%)
Moxibustion	11(34.4%)
Cupping	8(25%)
Aroma therapy	5(15.6%)
Meditation	5(15.6%)
Counselling and persuading therapy	4(12.5%)
Herbal acupuncture	3(9.4%)
Ear acupuncture	2(6.3%)
Relaxation exercise	2(6.3%)
Music therapy	2(6.3%)

1) Herbal Medicines

A total of 51 herbal medicines were mentioned in 23 papers, of which Bunsimgi-eum and Cheonggansoyosan appeared in 6 and 3 papers, respectively, and each of Gwakhyangjeonggisang, Hyangsapyeong-wisan, and Gwibitang appeared in 2 papers (Table 4).

Table 4. Herbal medicines mentioned in case reports and case series on Hwa-byung

Herbal Medicine	Korean name	Number of papers
Bunsimgi-eum	分心氣飲	6(26.1%)
Cheonggansoyosan	清肝逍遙散	3(13%)
Gwakhyangjeonggisang	藿香正氣散	2(8.7%)
Hyangsapyeong-wisan	香砂平胃散	2(8.7%)
Gwibitang	歸脾湯	2(8.7%)

2) Korean Medicine pattern

Of the 32 papers, there were 3, 22, and 7 papers with visceral patterns, four constitutional patterns, and without pattern, respectively. A total of 28

Korean medicine patterns were described in 25 papers, of which liver qi depression and qi depression were described in 7 and 6 papers, respectively, and each of heart-kidney non-interaction and liver fire flaming upward was described in 4 papers. Korean medicine patterns described in at least 2 papers are presented in Table 5.

Table 5. Korean Medicine patterns described in case reports and case series on Hwa-byung

Korean Medicine pattern	Korean name	Number of papers
Liver qi depression	肝氣鬱結	7(28%)
Qi depression	氣鬱	6(24%)
Heart-kidney non-interaction	心腎不交	4(16%)
Liver fire flaming upward	肝火上炎	4(16%)
Heart deficiency with timidity	心膽虛怯	3(12%)
Depressed qi transforming into fire	氣鬱化火	3(12%)

3) Acupuncture points

A total of 62 acupuncture points were mentioned in 21 papers, of which CV17 appeared in 14 papers and each of KI10, LI4, and CV12 appeared in 9 papers. Acupuncture points mentioned in at least 6 papers are presented in Table 6. Among the case

Table 6. Acupuncture points mentioned in case reports and case series on Hwa-byung

Acupuncture point	Korean name	Number of papers
CV17	膻中	14(66.7%)
KI10	陰谷	9(42.9%)
LI4	合谷	9(42.9%)
CV12	中脘	9(42.9%)
GV20	百會	8(38.1%)
ST36	足三里	8(38.1%)
ST25	天樞	8(38.1%)
LU8	經渠	7(33.3%)
PC6	內關	7(33.3%)
HT8	少府	7(33.3%)
LR3	太衝	7(33.3%)
LR4	中封	6(28.6%)

series, the one by Kim and Lee²¹⁾ reported 29 cases of Hwa-byung, but did not mention any acupuncture points.

4) Moxibustion points

A total of 15 moxibustion points were mentioned in 11 papers, of which CV12 and CV4 were mentioned in 8 and 6 papers, respectively, and each of ST36 and LR3 was mentioned in 2 papers (Table 7). Thirteen case series did not mention moxibustion.

Table 7. Moxibustion points mentioned in case reports and case series on Hwa-byung

Moxibustion point	Korean name	Number of papers
CV12	中脘	8(72.7%)
CV4	關元	6(54.5%)
ST36	足三里	2(18.2%)
LR3	太衝	2(18.2%)

4. Outcome measures

A total of 48 outcome measures were reported, including Beck Depression Index (BDI) in 15 papers, symptom change in 14 papers, and Minnesota Multiphasic Personality Inventory (MMPI) and State-Trait Anxiety Inventory (STAI) in 7 papers each. The outcome measures reported in at least 3 papers are presented in Table 8. Hwa-byung outcome measures made in Korea include the Hwa-byung Diagnostic Interview Schedule (HBDIS), Hwa-byung scale, Instrument of Oriental Medical Evaluation for Hwa-byung (IOMEHB), and Preliminary Hwa-byung Scale (PHB scale), of which the Hwa-byung scale is not a structured instrument, but an instrument made through independent development or modification of the HBDIS or IOMEHB. HBDIS is not a general outcome measure for measuring the severity of symptoms but a structured questionnaire tool for diagnose Hwa-byung.

Table 8. Outcome measure reported in case reports and case series on Hwa-byung

Outcome measure	Number of papers
BDI	15(46.9%)
symptom change	14(43.8%)
MMPI	7(21.9%)
STAI	7(21.9%)
SCL-90-R	6(18.8%)
VAS	6(18.8%)
STAXI	6(18.8%)
HBDIS	5(15.6%)
Hwa-byung scale	5(15.6%)
IOMEHB	4(12.5%)
SDS	3(9.4%)
HRV	3(9.4%)

BDI: Beck Depression Index; MMPI: Minnesota Multiphasic Personality Inventory; STAI: State-Trait Anxiety Inventory; SCL-90-R: Symptom Checklist-90-Revision; VAS: Visual Analogue Scale; STAXI: State-Trait Anger Expression Inventory; HBDIS: Hwa-Byung Diagnostic Interview Schedule; IOMEHB: Instrument of Oriental Medical Evaluation for Hwa-Byung; SDS: Zung's Self-rating Depression Scale; HRV: Heart Rate Variability.

Discussion

Hwa-byung was first mentioned as a disease concept in “Gyungakjeonseo (景岳全書)” in 1624²²⁾, and the first study on Hwa-byung in Korea was a literature review by Lee²³⁾ 1977 that explained the concept of Hwa-byung. The first clinical studies of Hwa-byung was a case report by Lee²⁴⁾ 1996, in which Hwa-byung was diagnosed and evaluated on the basis of symptom change in patients. Although the “Clinical evidence of Korean medicine”, published by the Association of Korean Medicine and the Korea Institute of Oriental Medicine in 2014, proposed a study design for studies on Hwa-byung, interventions, outcome measures, and results, since initially found 373 papers classified and analysed data, a complete enumeration survey was not conducted²⁵⁾. The clinical practice guidelines for Hwa-byung, published in 2013 in Korea, were established based on existing papers on Hwa-byung and the advice of experts. However, these were just

a summary of papers corresponding to each content and recommendation based on expert advice, so it was difficult to consider these as standard guidelines for the treatment of Hwa-byung²⁶⁾. Hence, in this study, we investigated all case reports and case series on Hwa-byung published in Korea, in order to analyse and report outcome measures, various interventions, and frequencies of patterns.

The first case report on Hwa-byung in Korea was published in 1996. Since then, papers on Hwa-byung have been published continuously until 2012. The “Anger syndrome” related to the Korean culture was introduced in the “Diagnostic and Statistical Manual of Mental Disorders-IV,” corresponding to the international standard in 1995¹⁾. Since then, several case reports and case series describing standard diagnosis, evaluation, and treatment of Hwa-byung have been published in Korea. No case reports or case series have been published after 2013 when the clinical practice guidelines for Hwa-byung were published in Korea. This is because after the publication of these guidelines, RCTs were conducted and published, rather than case reports and case series²⁷⁻⁹⁾. In addition, it has become difficult to publish the case report and case series on Journal of Oriental Neuropsychiatry, which previously accepted a lot of papers of Hwa-byung because of its renewal internal guidelines and many reports of Hwa-byung described similar patients’ symptoms.

A total of 32 papers reported 439 cases of Hwa-byung. These numbers are still too small to provide a strong basis for standardization of Hwa-byung treatment. Therefore, standardized guidelines for Hwa-byung should be developed through clinical studies based on the clinical practice guidelines.

Of the 32 papers, herbal medicine, acupuncture, moxibustion, and cupping were described in 23 (71.9%), 21 (65.6%), 11 (34.4%), and 8 papers (25%), respectively. This seems to be consistent with

opinions of experts from a survey, in that patients with Hwa-byung were treated mainly with acupuncture and herbal medicine, and moxibustion, cupping, and psychotherapy were used as complementary treatments³⁰.

Since occurrence of Hwa-byung is significantly affected by suppression of anger without control³¹, it is highly important to treat both physical and mental symptoms. Of the interventions used in the papers, treatments including meditation, relaxation exercises, and breathing belong to the mind body medicine defined by the National Center for Complementary and Alternative Medicine (NCCAM) and are considered appropriate for Hwa-byung treatment³².

Hwa-byung is highly correlated with relationships and has a high recurrence rate after treatment³³. This may be because the relationship of the patient with the people who provoked the uncontrollable anger were not dealt with, even though the symptoms were treated. Hence, if a patient is treated together with the person whom he/she regards as the cause, the treatment effect would last longer.

The most frequent pattern was liver qi depression, mentioned in 7 papers (28%), followed by qi depression in 6 papers (24%), each of heart-kidney non-interaction and liver fire flaming upward in 4 papers (16%), and each of heart deficiency with timidity and depressed qi transforming into fire in 3 papers (12%).

A total of 51 herbal medicines were mentioned in 23 papers, which include Bunsimgi-eum in 6 papers (26.1%), Cheonggansoyosan in 3 papers (13%), and Gwakhyangjeonggisang, Hyangsapyeong-wisan and Gwibitang in 2 papers (8.7%) each.

For correlations of pattern with prescription, Gwakhyangjeonggisang was used for qi depression, Bunsimgi-eum for liver qi depression, qi depression, heart-kidney non-interaction, and depressed qi transforming into fire, Cheonggansoyosan for liver fire flaming upward and depressed qi transforming into fire, Gwibitang for heart deficiency with

timidity, and Hyangsapyeong-wisan for digestive symptoms by qi depression and liver qi depression.

Through literature reviews and expert consultations, Yim¹⁴ presented 5 major patterns—liver qi depression, liver fire flaming upward, heart-kidney non-interaction, dual deficiency of qi and blood, and depressed gallbladder with harassing phlegm—and their symptoms in a table, and the “Clinical Guidelines for Hwa-byung” reported that the reliability of the 5 pattern instruments was secured based on clinical studies with 159 patients²⁶. Since patterns play an important role in the selection of treatment methods more confidently, if more pattern data are accumulated through more clinical studies, it will be possible to systematize Hwa-byung treatment methods by pattern.

Acupuncture points were mentioned in 21 papers — CV17 in 14 papers (66.7%), KI10, LI4, and CV12 in each 9 papers (42.9%), and GV20, ST36, and ST25 in each 8 papers (38.1%). These results are in agreement with the acupuncture points for Hwa-byung treatment presented in “Neuropsychiatry of Korean Medicine,” the textbook commonly used in the colleges of oriental medicine in Korea³⁴.

It is thought that since CV17 clears the lungs, resolves phlegm and moves qi to soothe the chest³⁵, CV17 was used for treatment of symptoms such as chest pain, oppression in the chest, and palpitations. Considering that 99% of patients with Hwa-byung experienced chest symptoms, CV17 was the most frequently used acupuncture point²⁶. Since KI10 tonifies the kidney and clears heat³⁵, it appears to be used for treatment of symptoms including upper body heat, headache, and hyperemia. LI4 clears and discharges lung qi and unblocks the meridian and activates collaterals³⁶, so that it seemed to be used for treatments of symptoms like upper body heat, headache, chest discomfort, and anxiety. CV12 regulates middle energizer and upward and downward of middle qi³⁵, so that it seems to be used for treatment of symptoms such as heart-kidney non-interaction or qi depression.

Moxibustion points were mentioned in 11 papers: CV12 and CV4 were used in 8 (72.7%) and 6 papers (54.5%), respectively. The “Clinical guidelines for Hwa-byung IV. (Medications & Acupuncture and Moxibustion)” stated that since Hwa-byung patients are likely to have cold abdomen due to movement of heat to the upper body, they need to be treated by circulation of qi blood through thermal stimulation of abdomen³⁷⁾. Since both of CV12 and CV4 are abdominal acupuncture points, this indicates that moxibustion on these points was intended to improve the upper heat and lower cold condition through thermal stimulation of the abdomen.

Of the 48 outcome measures reported in the 32 papers, BDI was reported in 15 papers (46.9%)—the highest number. BDI has been continuously used throughout the years, which indicates that it is an instrument to identify improvement of depressive symptoms in patients with Hwa-byung. In addition, HBDIS and IOMEHB, which are Hwa-byung scales made in Korea as Hwa-byung outcome measures, were used in 5 (15.6%) and 4 (12.5%) papers, respectively. Various outcome measures were used for a single case. There have been a number of attempts at establishing outcome measures for Hwa-byung in Korea, which is indicative of the attention this disease has received.

In addition, 14 papers (43.8%)—the second highest number—mentioned symptom change as an outcome measure, which indicates that Hwa-byung was treated based on subjective indices of patients, instead of objective diagnosis instruments. It indicates neurological psychiatric disorders measured by objective diagnosis instruments, but the final decision is based on symptoms changes of patients and experts' judgment. Of the outcome measures reported, heart rate variability (HRV) and digital infrared thermal imaging (DITI) were reported in 3(9.4%) and 1 paper (3.1%), respectively. Jung IC et al. proposed DITI and HRV as instruments to objectively measure Hwa-byung, other than

psychological scales³⁸⁾, but since the number of papers is insufficient, additional studies are necessary.

Currently, papers reporting clinical studies on Hwa-byung are still lacking, so the “Clinical Guidelines for Hwa-byung” published in Korea in 2013 do not have a strong basis. Therefore, it is necessary to perform more clinical studies that can be used as a basis for the establishment of clinical guidelines, in particular, RCTs, which have a higher reliability. This would enable researchers to verify, revise, and complement the clinical practice guidelines for a higher completion.

Conclusions

We found that most of the papers on Hwa-byung that were published in Korea were using Korean medicine interventions, such as acupuncture, herbal medicine, and moxibustion. Moreover, most of the case reports and case series stated that Korean medicine interventions were effective in treating Hwa-byung. Therefore, focusing on Korean medicine interventions while constructing international standard treatment guidelines for Hwa-byung can be of great assistance in treating patients with Hwa-byung.

Conflicts of interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

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