



Original Article

Characteristics and Treatment Methods of Bell's Palsy in Patients Visiting Korean Medicine Hospitals From August 2018 to July 2021

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ABSTRACT

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Background: This study was designed to statistically analyze the data of patients who had Bell's palsy (BP) who visited a Korean Medicine hospital in the last 3 years to determine the tendency or characteristics of their visit.

Methods: This study retrospectively analyzed the medical records of 816 patients. Based on the data collected through medical records demographics, condition/disease, and therapeutic characteristics of the patients were analyzed using IBM SPSS Version 23.0.

Results: Patients in their teens or younger, and 50s or older had a higher frequency of inpatient treatment, and 20s to 40s had a higher rate of outpatient treatment. The proportion of men who received steroid combination treatment was higher than women. The number of patients with BP, and the total treatment period of the patients has decreased every year. The total treatment period was shorter in the steroid group than the Korean medicine alone group. Inpatients were more likely to receive steroid combination therapy than outpatients. The proportion of patients who received steroid combination therapy was higher than patients with recurrence of BP. Patients with hypertension or diabetes had a higher rate of hospitalization and received more treatments than patients without the condition/disease.

Conclusion: Visit characteristics and treatment methods preferred by patients with BP were identified. This research may help to establish a treatment model for BP in Korean Medicine institutions in the future.

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Introduction

Bell's palsy (BP) is a condition/disease in which facial muscle movement is impaired due to facial nerve palsy and is one of the most common causes of facial nerve disorders. Its incidence is reported to be 11–40 cases per 100,000 people [1]. In general, BP is accompanied by unilateral acute facial paralysis, which gradually worsens over 24–48 hours, and facial weakness worsens up to 3–7 days [2,3]. It is reported that the incidence of BP is high between the ages of 15 to 50 years, and there is no difference in the incidence between the sexes [4]. It has been reported that about

80% of patients recover within 4–8 weeks without treatment, but if recovery is delayed beyond 3 months after the onset, incomplete recovery, synkinesis due to incorrect nerve re-regulation, and crocodile tears may occur [5]. Prognostic factors that affect patient recovery from BP include sex, age, presence of hypertension and diabetes, a history of smoking, nerve conduction test results, severity of the initial paralysis, and degree of recovery from the initial paralysis [6–9].

BP treatment includes drug therapy, physical therapy, and surgical therapy. The most commonly used drugs are steroids and antivirals, which reduce inflammation and swelling at the injured

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site [10]. Acupuncture and herbal medicine are the most common Korean medicine treatments for BP, and other methods such as electroacupuncture, pharmacopuncture, thread-embedding therapy, and chuna therapy are also used [11–15]. Although there have been many case reports and studies on Korean medicine treatment for BP [16,17], there are no reports on the correlation between patients' with BP and their visits to a Korean medicine institution and the factors that affect their condition.

Therefore, the effects of hospitalization, steroid use, treatment frequency, and duration of BP among patients who were treated at a Korean Medicine hospital from August 01, 2018 to July 31, 2021 were analyzed. Retrospective analysis of these factors and their correlations are reported in this study.

Materials and Methods

Study individuals

Medical records were collected from 1,044 patients who underwent acupuncture treatment at least once due to facial paralysis from August 01, 2018 to July 31, 2021 who visited the Department of Acupuncture and Moxibustion Medicine at a Korean Medical hospital (Fig. 1). The data used in this study was analyzed after consulting professors of the Department of Korean Medicine and Statistics. This study was exempt from IRB deliberation (IRB no.: DJDSKH-21-E-38).

Exclusion criteria

Non-peripheral facial paralysis: central facial paralysis, simple paresthesia, postoperative blunt closure, Meniere's disease, Guillain-

Barre syndrome, simple angular deviation, simple blepharospasm, and filler side effects. Non-BP: Ramsay Hunt syndrome, mastitis, and Arnold-Chiari syndrome. In the case of a sequelae of a previous onset, not an acute onset (< 1 month).

Demographic characteristics

Period

The total study period was from August 01, 2018 to July 31, 2021. The study periods were: August 01, 2018 to July 31, 2019 (2018.08–2019.07), August 01, 2019 to July 31, 2020 (2019.08–2020.07), and August 01, 2020 to July 31, 2021 (2020.08–2021.07).

Sex

Patients were classified into male and female.

Age groups

Patients were classified into < 10, 10s, 20s, 30s, 40s, 50s, 60s, 70s, and ≥ 80s age ranges.

Condition/ disease and treatment characteristics

The total treatment period, number of treatments and hospitalization days, onset period, affected side, underlying condition/disease, and steroid use were investigated by reviewing patient medical records.

Statistical analysis

Medical records were statistically analyzed using IBM SPSS Statistics Version 23.0. The demographics, condition/disease, and therapeutic characteristics of the patients were analyzed using frequency analysis and descriptive statistics for each item. Categorical variables were expressed as frequencies and ratios, and continuous variables were expressed as means and standard deviations. There were 4 analysis tools used for statistical analysis and if the *p* value was less than 0.05, the difference was considered statistically significant.

1) Crossover analysis: Analysis of associations between categorical variables using a chi-square test.

2) Independent sample *t* test and 1-way ANOVA: Correlation analysis between categorical and continuous variables.

3) Multiple linear regression analysis: Analysis of factors that affected continuous categories.

4) Binary logistic regression analysis: Analysis of factors that affected binary categories.

Results

Frequency analysis and descriptive statistics

Demographic characteristics

This study included 816 patients of which there were 417 outpatients and 399 inpatients. By year, there were 283 patients (34.7%) who visited the hospital during 2018.08–2019.07, and this was the largest number of patients' visits. There were 274

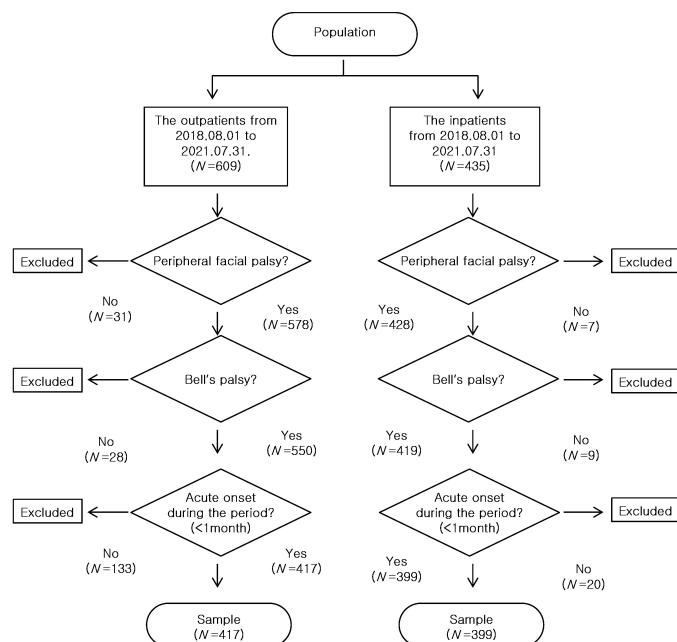


Fig. 1. Study flow chart.

(33.6%), and 259 (31.7%) patients who visited between 2019.08–2020.07, and 2020.08–2021.07, respectively. The number of patients decreased over the 3 years. There were 136 were outpatients (48.1%) and 147 (51.9%) were inpatients in 2018.08–2019.07, there were 142 outpatients (51.8%) and 132 inpatients (48.2%) in 2019.08–2020.07, and in 2020.08–2021.07, there were 138 (53.3%) outpatients and 121 (46.7%) inpatients. Although the number of outpatients remained relatively constant every year, the number of inpatients gradually decreased.

Among the patients, 392 (48.0%) were men and 424 (52.0%) were women. By age group, those in their 50s (*n* = 209) accounted for the highest percentage of patients (25.6%), and those under the age of 10 (*n* = 2) had the smallest percentage (0.2%). The oldest patient was 89 years, and youngest patient was < 1 year, and the mean and standard deviation were 52.28 ± 15.68 years (Table 1).

Condition/disease characteristics

There were 399 patients (48.9%) who had left side paralysis and 416 patients (51.0%) who had right side paralysis.

In the case of comorbidities, 185 patients (22.7%) had

hypertension, and 127 (15.6%) had diabetes. As for onset and recurrence, there were 717 patients (87.9%) who had first onset, and 99 patients (12.1%) who visited the hospital after a relapse (Table 2).

Table 2. Frequency Analysis and Descriptive Statistics of Condition/Disease Characteristics.

Affected side	Left	399	48.9	
	Right	416	51.0	
Comorbidities	Hypertension	Yes	185	22.7
		No	631	77.3
	Diabetes	Yes	127	15.6
		No	689	84.4
Recurrence	No	717	87.9	
	Yes	99	12.1	

Table 1. Frequency Analysis and Descriptive Statistics of Demographic Characteristics.

Categories		No. of patients	%	
Time period	2018-2019	Inpatients	141	51.9
		Outpatients	136	48.1
	2019-2020	Inpatients	132	48.2
		Outpatients	142	51.8
	2020-2021	Inpatients	121	46.7
		Outpatients	138	53.3
Sex	Female	424	52.0	
	Male	392	48.0	
Age (y)	1-9	2	0.2	
	10-19	18	2.2	
	20-29	58	7.1	
	30-39	97	11.9	
	40-49	147	18.0	
	50-59	209	25.6	
	60-69	181	22.2	
	70-79	79	9.7	
	≥ 80	25	3.1	
Mean ± SD		52.28 ± 15.675		
Time period	2018.08-2019.07	283	34.7	
	2019.08-2020.07	274	33.6	
	2020.08-2021.07	259	31.7	

Therapeutic properties

Among the patients who visited the hospital with BP, there were 417 (51.0%) individuals who received outpatient treatment and 399 (49.0%) received inpatient treatment.

Analysis of the number of treatments for the 417 outpatients revealed that the minimum number of visits was 1, the maximum was 325, and the mean and standard deviation were 15.96 ± 25.84 . The number of patients decreased as the number of treatments increased: 165 patients (39.6%) had 5 or fewer treatments, 68 patients had 6–10 treatments (16.3%), and 52 patients had 11–15 treatments (12.5%).

Analysis of the hospitalization periods for the 399 inpatients identified the minimum number of days as 1, and the maximum as 46, and a mean and standard deviation of 13.9 ± 7.71 days. Regarding the length of hospitalization, 159 patients (39.8%) were hospitalized for 1–2 weeks, followed by 99 patients (24.8%) who were hospitalized for 2–3 weeks.

The total average treatment period for all 816 (outpatients and inpatients) was 63.21 ± 114.40 days, with a minimum of 1 day and a maximum of 941 days. Regarding the duration of treatment, 455 patients (55.8%) were treated for less than 1 month, 151 patients (18.5%) were treated for more than 1 month and less than 2 months, and 79 patients (9.7%) were treated for more than 2 months and less than 3 months. A decreasing trend was observed as the treatment period increased.

Of the total patients, 714 (87.5%) were treated with Korean medicine and steroids in combination, and 102 (12.5%) were treated with Korean medicine alone (Table 3).

Cross-analysis

Use of steroids

Cross-analysis was performed using the chi-square test to determine the correlation between sex, age group, onset time period,

Table 3. Frequency Analysis and Descriptive Statistics of Therapeutic Characteristics.

Categories		No. of patients	%
Admission	No	417	51.0
	Yes	399	49.0
No. of treatments (Only outpatients)	1–5	165	39.6
	6–10	68	16.3
	11–15	52	12.5
	16–20	43	10.3
	21–25	23	5.5
	26–30	19	4.6
	> 30	47	11.3
	Mean \pm SD		15.96 ± 25.842
Hospitalized (Only inpatients)	≤ 1 wk	82	20.6
	1–2 wk	159	39.8
	2–3 wk	99	24.8
	3–4 wk	39	9.8
	> 4 wk	20	5.0
	Mean \pm SD		13.9 ± 7.705
Treatment duration	0–1 mo	455	55.8
	1–2 mo	151	18.5
	2–3 mo	79	9.7
	3–4 mo	27	3.3
	> 4 mo	104	12.7
	Mean \pm SD		63.21 ± 114.404
Taking steroids	No	102	12.5
	Yes	714	87.5

occurrence, affected side, recurrence, hospitalization, hypertension, diabetes, and steroid use. There were significant differences in the use of steroids between the sexes ($p < 0.05$), onset time period ($p < 0.001$), hospitalization ($p < 0.001$), and recurrence ($p < 0.05$).

There were 355 (90.6%) men who were in the steroid and Korean medicine combination group, which was relatively higher than women (359, 84.7%; Table 4).

As a result of analyzing the use of steroids according to the onset time period, the steroid combination group contained 251 patients (91.6%) in 2019.08–2020.07, and this number was higher than the 230 (81.3%) patients in this cohort in 2018.08–2019.07. The Korean medicine non-steroid group included 53 (18.7%) patients in 2018.08–2019.07, which was higher than the 23 (8.4%) patients in 2019.08–2020.07 (Table 5).

Analysis of the use of steroids according to hospitalization revealed that in the inpatient group, the steroid combination group comprised 377 (94.3%) patients, and more than 338 (81.1%) patients were included in the outpatient group. In the outpatient group, 79 patients (18.9%) were in the non-steroid group, and 23 (5.8%) were in the inpatient group (Table 6).

As a result of analyzing the use of steroids according to recurrence of BP, in the nonsteroid group, 20 (20.2%) patients relapsed once,

and in 82 (11.4%) patients, it was their initial occurrence. In the steroid group, the number of patients where the occurrence of BP was the first time, accounted for 635 patients (88.6%), and 79 (79.8%) patients relapsed (Table 7).

Admission

A cross-analysis was performed using the chi-square test to determine the differences in hospitalization according to sex, age group, onset time period, occurrence, affected side, recurrence, hypertension, and diabetes. As a result, significant differences in hospitalization according to sex ($p < 0.05$), age group ($p < 0.05$), hypertension ($p < 0.001$), and diabetes ($p < 0.001$) were identified.

The number of patients who received outpatient treatment alone was higher among men (216; 55.1%) than women (200; 47.2%). Among women, the number of patients who received inpatient treatment was 224 (52.8%), which was higher than men, 176 (44.9%; Table 8).

When hospitalization was analyzed according to age, in the case of teenage patients, 14 were hospitalized (77.8%), which was higher than other groups. Among patients in their 50s, there were 114 patients (54.5%) who received inpatient treatment, which was higher than other age groups. For patients under the age of 10, 2

Table 4. Crossover Analysis of Treatment, Method, and Sex.

Categories			Taking steroids		Total	X ²
			Yes	No		
Sex	Male	No.	355	37	392	6.399*
		%	90.6	9.4	100.0	
	Female	No.	359	65	424	
		%	84.7	15.3	100.0	
Total	No.	714	102	816		
	%	87.5	12.5	100.0		

* $p < 0.05$

Table 5. Crossover Analysis of Treatment Method and Onset Time Period.

Categories			Taking steroids		Total	X ²
			Yes	No		
Onset time period	2018.08–2019.07	No.	230	53	283	15.694*
		%	81.3	18.7	100.0	
	2019.08–2020.07	No.	251	23	274	
		%	91.6	8.4	100.0	
	2020.08–2021.07	No.	233	26	259	
		%	90.0	10.0	100.0	
Total	No.	714	102	816		
	%	87.5	12.5	100.0		

* $p < 0.001$.

Table 6. Crossover Analysis of Treatment Method and Admission.

Categories			Taking steroids		Total	X ²
			Yes	No		
Admission	Yes	No.	377	23	400	32.533*
		%	94.3	5.8	100.0	
	No	No.	337	79	416	
		%	81.1	18.9	100.0	
Total	No.	714	102	816		
	%	87.5	12.5	100.0		

* $p < 0.001$.

Table 7. Crossover Analysis of Treatment Method and Recurrence.

Categories			Taking steroids		Total	X ²
			Yes	No		
Recurrence	Yes	No.	79	20	99	6.111*
		%	79.8	20.2	100.0	
	No	No.	635	82	717	
		%	88.6	11.4	100.0	
Total	No.	714	102	816		
	%	87.5	12.5	100.0		

* $p < 0.05$.

Table 8. Crossover Analysis of Admission and Sex.

Categories			Admission		Total	X ²
			Yes	No		
Sex	Male	No.	176	216	392	5.128*
		%	44.9	55.1	100.0	
	Female	No.	224	200	424	
		%	52.8	47.2	100.0	
Total	No.	400	416	816		
	%	49.0	51.0	100.0		

* $p < 0.05$.

patients received only outpatient treatment, and more than 50% of those in their 20s, 30s, 40s, and 70s received outpatient treatment (Table 9).

Among inpatients, 124 (67.0%) had hypertension, which was relatively higher than those without hypertension, 276 (43.7%). Among outpatients, there were 355 (56.3%) individuals without hypertension, and this frequency was greater than the 61 (22.0%) individuals with hypertension (Table 10).

Among hospitalized patients, 82 patients (64.6%) had diabetes, and this was higher than the 318 patients (46.2%) without diabetes.

Among outpatients, 371 patients (53.8%) were without diabetes, and this was higher than the 45 patients (35.4%) with diabetes (Table 11).

Independent sample t test and 1-way ANOVA

Total duration of treatment

One-way ANOVA was performed to determine the differences in the total treatment period according to age, onset year, and onset variables. There was a significant difference in the total treatment period according to the onset time period ($p < 0.01$). Furthermore, the average

Table 9. Crossover Analysis of Admission and Age Group.

Categories		Admission		Total	X ²	
		Yes	No			
Age range (y)	1-9	No.	0	2	2	16.304*
		%	0.0	100.0	100.0	
	10-19	No.	14	4	18	
		%	77.8	22.2	100.0	
	20-29	No.	25	33	58	
		%	43.1	56.9	100.0	
	30-30	No.	43	54	97	
		%	44.3	55.7	100.0	
	40-49	No.	61	86	147	
		%	41.5	58.5	100.0	
	50-59	No.	114	95	209	
		%	54.5	45.5	100.0	
	60-59	No.	92	89	181	
		%	50.8	49.2	100.0	
	70-79	No.	37	42	79	
		%	46.8	53.2	100.0	
	≥ 80	No.	14	11	25	
		%	56.0	44.0	100.0	
Total	No.	400	416	816		
	%	49.0	51.0	100.0		

*p < 0.05.

Table 10. Crossover Analysis of Admission and Hypertension.

Categories		Admission		Total	X ²	
		Yes	No			
Hypertension	Yes	No.	124	61	185	31.043*
		%	67.0	33.0	100.0	
	No	No.	276	355	631	
		%	43.7	56.3	100.0	
Total	No.	400	416	816		
	%	49.0	51.0	100.0		

*p < 0.001.

total treatment period values gradually decreased from 2018.08-2019.07 to 2019.08-2020.07 and 2020.08-2021.07 (Table 12).

Number of outpatient treatments

An independent sample *t* test was performed to determine the differences in the number of treatments according to the variables

of sex, affected side, steroid use, hypertension, and diabetes in outpatients. A difference in the number of treatments according to the presence of hypertension (*p* < 0.05) was observed. The average number of treatments for patients with hypertension was 22.59, which was higher than patients without hypertension (14.82; Table 13).

Table 11. Crossover Analysis of Admission and Diabetes.

Categories			Admission		Total	X ²
			Yes	No		
Diabetes	Yes	No.	82	45	127	14.548*
		%	64.6	35.4	100.0	
	No	No.	318	371	689	
		%	46.2	53.8	100.0	
Total	No.	400	416	816		
	%	49.0	51.0	100.0		

* $p < 0.001$.

Table 12. One-Way ANOVA of Treatment Duration and Onset Time Period.

Categories	Treatment duration			F	p
	No.	Mean	SD		
Onset time period	2018.08-2019.07	283	77.78	3.813	0.022*
	2019.08-2020.07	274	59.03		
	2020.08-2021.07	259	51.71		

* $p < 0.05$.

Table 13. Independent T Test of Treatment Number and Hypertension.

Categories	No. of Treatments			T
	No.	Mean	SD	
Hypertension	Yes	61	22.59	2.180*
	No	356	14.82	

* $p < 0.05$.

Multiple linear regression analysis

Total duration of treatment

Multiple linear regression analysis was performed to determine the variables that affect the total treatment period, which was confirmed as a suitable model ($F = 3.096$, $p = 0.001$, and p value of 0.05). Among the independent variables, the onset time period ($B = -0.176$, $p < 0.05$), presence of steroid use ($B = -0.753$, $p < 0.001$), and presence of hospitalization ($B = -0.285$, $p < 0.05$) was affected by the total treatment period. Notably, as the onset time period progressed, the treatment period was shorter in the steroid combined group than in the non-steroid group, and in hospitalization, rather than outpatient treatment (S1).

Number of outpatient treatments

Multiple linear regression analysis was performed to determine the variables that affected the number of outpatient treatments, and it was determined to be a suitable model ($F = 2.037$, $p = 0.034$, and p value of 0.05). Among the independent variables, the use of

steroids ($B = -0.872$, $p < 0.01$) and the presence of hypertension ($B = -0.648$, $p < 0.05$) affected the number of outpatient treatments as dependent variables. The treatment period reduced in the steroid combination group, and in the absence of hypertension (S2).

Inpatient hospitalization period

Multiple linear regression analysis was performed to determine the variables that affected the hospitalization period for inpatients, and it was determined to be a suitable model ($F = 2.082$, $p = 0.037$, and a p value of 0.05). Among the independent variables, sex and steroid use were observed to affect the length of hospitalization. That is, women had a longer hospitalization period than men, and the steroid treatment group had a shorter hospital stay than the non-steroid treatment group (S3).

Binary logistic regression analysis

Recurrence

Binary logistic regression analysis showed that there were no

statistically significant variables that affected recurrence (S4).

Admission

Binary logistic regression analysis was performed to identify variables that affected hospitalization. The results showed that sex ($B = -0.448$, $\text{Exp}(B) = 0.639$, $p < 0.001$), onset time period ($B = 0.221$, $\text{Exp}(B) = 1.247$, $p < 0.05$), steroid use ($B = 1.574$, $\text{Exp}(B) = 4.827$, $p < 0.001$), hypertension ($B = 0.990$, 2.692 , $p < 0.001$), and diabetes ($B = 0.518$, $\text{Exp}(B) = 1.679$, $p < 0.05$) affected hospitalization. That is, the odds ratio for hospitalization for women increased 0.448 times compared with men, the odds ratio for hospitalization decreased 0.221 times as the onset time period was later. The odds ratio for hospitalization in the steroid group was 1.574 times higher than the non-steroid group. In addition, the odds ratio for hospitalized hypertensive patients was 0.990 times higher than patients without hypertension, and for diabetic patients, the odds ratio for hospitalization was 0.518 times higher than non-diabetic patients (S5).

Steroids use

Binary logistic regression analysis was performed to identify the variables that affected steroid use. The results showed that sex ($B = 0.759$, $\text{Exp}(B) = 2.137$, $p = 0.001$), age ($B = 0.017$, $\text{Exp}(B) = 1.017$, $p = 0.033$), onset time period ($B = -0.554$, $\text{Exp}(B) = 0.575$, $p < 0.001$), recurrence ($B = -0.813$, $\text{Exp}(B) = 0.443$, $p = 0.006$), and hospitalization ($B = 1.635$, $\text{Exp}(B) = 5.132$, $p < 0.001$) had an impact on steroid use. Notably, the odds ratio for women who received Korean medicine alone increased 0.759 times compared with men. As patient age increased by 1 year, the odds ratio of not receiving steroid treatment increased 0.017 times. Furthermore, as the onset time period increased by 1 year, the odds ratio for receiving steroid therapy increased 0.554-fold. In addition, the odds ratio of receiving Korean medicine monotherapy increased 0.813 times in patients with relapsed BP compared with patients with initial onset. Lastly, patients who received inpatient treatment were 1.635 times more likely to receive steroid treatment than those who did not (S6).

Discussion

BP is the most common cause of facial nerve palsy, accounting for approximately 51% of all patients with facial nerve palsy. It can occur at any age, but its incidence is relatively low in children under 10 years and in the elderly [18]. It has been reported that the probability of developing BP is high during pregnancy [19], and in the presence of underlying conditions/diseases such as hypertension or diabetes [20,21]. Reactivation of latent herpes virus is the main cause of facial nerve edema [22]. Most facial nerve palsies caused by viral damage recover spontaneously, but only about 71% recover completely if not properly treated [23]. One study reported that steroid administration at the early stage of onset prevents nerve edema progression and nerve damage, thereby reducing the risk of permanent facial nerve paralysis [24].

Recently, in many Korean Medicine hospitals and clinics, many Korean-Western cooperative treatments have been implemented [25-27]. However, no study has analyzed the correlation between

hospital visits among patients with BP and treatment tendencies.

Of the included patients, 283 patients (34.7%) visited the hospital between August 01, 2018, and July 31, 2019, 274 patients (33.6%) visited the hospital from August 01, 2019 to July 31, 2020, and 259 (31.7%) patients visited the hospital from August 01, 2020 to July 31, 2021. Notably, the number of patients who visited the hospital for BP decreased every year. This is similar to the report of the 2018-2020 Health Insurance Statistical Yearbook published by the Health Insurance Review and Assessment Service and the National Health Insurance Corporation [28-30].

Demographic statistics of the patients showed that 392 (48.0%) were men and 424 were women (52.0%) showing a similar incidence rate between men and women. The average age was 52.28 years, those in their 50s accounted for most of the population ($n = 209$, 25.6%), with those in their 60s accounting for 181 people (22.2%), those in their 40s accounting for 147 people (18.0%), and those in their 40s and 60s accounting for 75.8% of the total. This observation was consistent with the results of previous studies that showed that the majority of patients treated for BP were in their 40s and 60s [31].

As a result of investigating condition/disease characteristics, the most common occurrence was in March, with 89 patients (10.9%), followed by 78 patients (9.6%) in September and 76 patients (9.3%) in January. The month with the least number of patients was May, with 53 patients (6.5%) visiting the hospital. Prior studies that investigated the correlation between the incidence and season of BP cases were reviewed and it was concluded that results were inconsistent [32]. In this current study no statistical significance between incidence and season was identified. The left side was affected in 399 patients (48.9%) with BP and the right side was affected in 416 patients (51.0%) suggesting a relatively even distribution similar to the results of a previous study [33]. Analysis of the underlying conditions/diseases revealed that 185 (22.7%) patients had hypertension and 127 (15.6%) had diabetes. Notably, hypertension and diabetes are the most common conditions of vascular disease and are considered to be risk factors for BP [20,21]. Analysis of relapse revealed that 99 patients (12.1%) visited the hospital with recurrent BP, which is in agreement with the incidence of recurrent BP (range from 0.8-19.4%) in a previous study [34].

Analysis of the therapeutic characteristics revealed that 417 patients (51.0%) received outpatient treatment only, and the remaining 399 patients (49.0%) received inpatient treatment. About half of the patients who came to the hospital with BP chose to be admitted. The number of outpatient treatments was 165 (39.6%) with 1-5 treatments, 68 (16.3%) with 6-10 treatments, and 52 (12.5%) with 11-15 treatments. As the rounds progressed, the number of patients who continued treatment decreased. As a result of analyzing the length of hospitalization, 159 patients (39.8%) were hospitalized for 1-2 weeks, 99 patients (24.8%) for 2-3 weeks, and 82 patients (20.6%) for less than 1 week. When the total treatment period was investigated for all patients, the mean and standard deviation were 63.21 ± 114.40 days. Notably, 455 patients (55.8%) were treated for less than 1 month, and 151 patients (18.5%) received treatment from 1 month to less than 2 months. Therefore, patients who were treated for less than 2 months accounted for

74.3% of the total study population. This finding was consistent with the results of a previous study which reported that 70–80% of patients with BP fully recovered within 2 months [18]. However, a follow-up study is needed to determine the number of treatments that ended due to recovery from the condition/disease.

As a result of analyzing the correlation between sex and the use of steroids, it was determined that among men, 355 patients (90.6%) received steroid treatment, which was relatively higher than in women, 359 (84.7%). It has previously been reported that female patients are more satisfied with Korean medicine treatment than male patients [35]. However, it remains unclear whether sex preferences for Korean medicine treatment affected this result. Furthermore, restrictions on steroid combination treatment due to age or underlying conditions/diseases, such as diabetes, may impact these findings.

The use of steroids in each time period of a year was examined, and compared against 2018.08–2019.07, when the Korean medicine alone treatment group accounted for 18.7% of the total, in 2019.08–2020.07 and 2020.08–2021.07, this patient cohort decreased by approximately half, to 8.4% and 10.0%, respectively. In other words, more recently, patients with BP tended to choose steroid combination therapy rather than Korean medicine alone. It is possible that the use of steroid combination therapy has increased for reasons such as active recommendations from medical staff on steroid combination therapy or increased awareness of patient conditions/diseases.

Analysis of the use of steroids for inpatients revealed that 377 patients (94.3%) were in the steroid combination group, which was higher than the 338 patients (81.1%) in the outpatient steroid combination group. The reason for this may be that it is easy for inpatients to receive steroid combination treatment at Korean–Western cooperative hospitals through Korean–Western collaborations.

Analyzing whether steroid combination therapy was used according to recurrence, it was determined that 635 patients (88.6%) among the initial onset cohort received steroid combination therapy, while 79 patients (79.8%) received steroid combination therapy among the relapse cohort. In the case of an initial occurrence, unless the patient was old or had underlying conditions/diseases, there was a high possibility of receiving the steroid combination treatment according to the recommendation of medical staff. However, in case of relapse, it seems that Korean medicine treatment was preferred rather than conventional Western treatment.

As a result of analyzing the inpatient treatment rate according to sex, 224 (52.8%) women received inpatient treatment, which was higher than men ($n = 176$, 44.9%). This is thought to be the result of conditions such as social factors including social activity and occupation.

Analysis of the inpatient treatment rate according to age showed that among teenage patients, 14 (77.8%) were hospitalized, which was the highest recorded rate. Furthermore, 14 patients (56.0%) in their 80s or older, 114 patients in their 50s (54.5%), 92 patients in their 60s (50.8%), and 37 patients (46.8%) in their 70s required hospitalization. People in their 20s–40s are relatively socially active, so this is thought to result in the lower hospitalization rate than teenagers, and those in their 80s.

Among the patients with hypertension, 124 (67.0%) were hospitalized, and among patients with diabetes, 82 (64.6%) were hospitalized. The hospitalization rate of these patients was comparatively high. Although previous studies have reported that hypertension and diabetes do not correlate with the degree of recovery from BP [36], it was hypothesized that the presence of an underlying condition/disease may factor into the patients' preferences for inpatient treatment. Furthermore, as the hospitalization rate increased in patients over 50, the association between age and underlying condition/disease may also have been a factor.

As a result of analyzing the differences in the total treatment period by 1 year time periods using 1-way ANOVA, the total treatment period decreased from 2018 to 2021. This is because the individuals in this study were patients at a Korean Medicine hospital. Furthermore, the patients likely chose outpatient treatment at a nearby Korean clinic after treatment at a hospital-level medical institution and the steroid combination treatment likely affected the treatment period. For a more accurate prediction, a follow-up study on the recovery rate from the condition/disease and the duration of treatment is needed.

Analysis of the difference in the number of outpatient treatments for hypertension using the independent sample t test showed that the average number of treatments for patients with hypertension was 22.59 days, which was higher than the 14.82 days for patients without hypertension. In a previous study on the prognostic factors of BP and Ramsay Hunt syndrome, patients without hypertension showed a higher degree of improvement in Ramsay Hunt syndrome than patients with hypertension ($p = 0.025$). However, the relationship between the degree of severity and recovery has not yet been elucidated [37]. Therefore, a follow-up study is needed to determine whether hypertension affects the degree of improvement in BP and increases the number of treatments required.

Multiple linear regression analysis was performed to analyze the variables that influenced the total treatment period. Notably, the total treatment period in the steroid combination group was less than the non-steroid group for all patients. Analysis of each group of outpatients and inpatients also confirmed that the number of outpatient treatments and the length of hospitalization was less in the steroid combination treatment group. This is in agreement with the results of previous studies, in which the patient group that received Korean–Western combination treatment showed a significantly higher degree of improvement than the patient group that received Korean medicine treatment alone [25–26]. In addition, the total treatment period shortened over each onset time period. This finding was also consistent with the observation that the mean total treatment period gradually decreased each year in the previous 1-way ANOVA evaluation. The fact that the number of outpatient treatments decreased in the group without hypertension compared with the hypertension group is also consistent with the previous analysis in this study where the independent sample t test was used. In addition, the length of hospitalization was greater for women compared with men, consistent with the above-described difference in hospitalization rates by sex.

Binary logistic regression analysis of the variables that affected hospitalization showed that when the patient was female, the onset

time period was earlier, steroid treatment was used, and there were underlying conditions/diseases such as hypertension and diabetes, and the odds ratio for inpatient treatment was higher than for those who only received outpatient treatment. Sex, steroid use, and underlying conditions/diseases had the same results as determined in the previous crossover analysis. Although the cross-analysis revealed that the differences in hospitalization rate by 1 year period was not statistically significant, the number and proportion of patients tended to decrease with each passing year: 174 patients (51.9%) in 2018.08–2019.07, 132 (48.2%) in 2019.08–2019.07, and 121 (46.7%) in 2020.08–2021.07. The 2018–2020 Health Insurance Statistical Yearbook, reported the number of patients hospitalized for facial neuropathy at Korean Medicine institutions gradually decreased from 2018 to 2020, in agreement with the results of this study. However, the number of hospitalized patients with facial neuropathy has been reported to have gradually increased in all medical institutions from 2018 to 2020, which conflicts with our results [28–30]. It is possible that increased awareness of conditions/diseases may lead patients to choose steroid therapy in Western medicine institutions rather than Korean Medicine institutions. Publicity is needed to raise awareness of Korean medicine treatment.

Analysis of the variables that influence the use of steroids revealed that the odds ratio of not receiving steroid combination treatment was higher in women than in men, in older age cohorts, in earlier onset, during relapse rather than initial onset, and in outpatient treatment rather than hospitalization. The factors related to sex, onset time period, recurrence, and hospitalization that were identified in this study agreed with previous cross-analysis results. In relation to the decrease in the rate of receiving steroid combination therapy with age, steroid combination treatments were examined according to age. Even though the results of the cross-analysis were not statistically significant ($p = 0.083$), from the teen to the 60s cohorts, the rate of the steroid combination treatment ranged from a high of 80% to a low of 90%, and after the 70s, the rate of steroid combination treatment decreased sharply. This is presumably because elderly patients are burdened with active steroid combination treatment due to underlying conditions/diseases, such as diabetes. In addition, steroid preparations have the potential to induce hypertension due to sodium retention, vasoconstriction, and norepinephrine action-enhancing effects [38], which leads to a lower rate of steroid administration in the elderly than in other age groups.

This study is significant in that it evaluated patients who received Korean medicine treatment, unlike previous studies that investigated the clinical features of patients with BP who visited Korean Medicine institutions [31,39]. Furthermore, this study included a large number of patients compared with previous studies and evaluated treatment periods, frequency, and total treatment period according to the classifications of inpatients and outpatients, which were not performed in previous studies.

However, this study has a limitation in that it is difficult to obtain accurate information by estimating the degree of improvement throughout the treatment period. Due to the large number, the evaluation of each patient's condition/disease state was not made, such as the use of the House–Brackmann grade or Yanagihara score. This was also a retrospective study based on data collected through

medical records, which may be subject to bias. We hope that further studies will address these limitations in the future.

Conclusion

The following conclusions were obtained by analyzing the demographic, clinical, and therapeutic characteristics of patients with BP by using medical records.

1. The analysis according to age revealed that patients in their teens or younger, and those in their 50s or older, had a higher rate of inpatient treatment, and those in their 20s to 40s had a higher rate of outpatient treatment.

2. Analysis according to sex revealed that the proportion of men who received steroid combination treatment was higher than women, and the proportion of women who received inpatient treatment was higher than men.

3. The analysis of the onset 1-year time period revealed that the number of patients with BP decreased every year for 3 years, and the total treatment period of the patients also decreased. Furthermore, the proportion of patients treated with steroids increased over the 3-year time period.

4. The analysis of steroid use showed that the total treatment period was shorter in the steroid group than in the Korean medicine alone group. In addition, in the steroid group, the number of treatments was relatively small during outpatient treatment, and the length of hospitalization was relatively short during inpatient treatment.

5. Analysis of hospitalization revealed that inpatients were more likely to receive steroid combination therapy than outpatients, and inpatients also had a shorter total treatment period than outpatients.

6. The analysis according to recurrence revealed that the proportion of patients who received steroid combination therapy was higher than patients with recurrence of BP.

7. Analysis according to underlying condition/disease revealed that patients with hypertension or diabetes had a higher rate of hospitalization than patients without the conditions/diseases. Furthermore, outpatients with hypertension received a higher number of treatments than those without hypertension.

In this study, the recent trends of patients with BP was investigated: the status of concurrent steroid treatment for patients visiting a Korean Medicine hospital, the preference for outpatient or hospitalization according to the patient's characteristics, and the correlation between several variables and the number or duration of treatment. This study may help develop a treatment model for BP in Korean Medicine hospitals.

Supplementary Materials

Supplementary material is available at doi:<https://doi.org/10.13045/jar.2022.00073>.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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None.

Ethical Statement

This research did not involve any human or animal experiments.

Data Availability

All relevant data are included in this manuscript.

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