Original Article

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A descriptive statistical analysis of inpatients with lumbar disc herniation at a Korean medicine hospital in 2014

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[Abstract]

Objectives : This is a retrospective statistical analysis of the demographic and therapeutic characteristics influencing the continued improvement of symptoms in patients treated in 2014 for herniated lumbar discs at a Korean medicine hospital; thereby, providing clinical data to further improve medical services of Korean medicine.

Methods : We investigated the demographic and therapeutic variables of all patients who were diagnosed with a herniated lumbar intervertebral disc and were hospitalized for more than 1 night at Dunsan Korean medicine hospital from January 1, 2014, to December 31, 2014. IBM SPSS 21.0 was used to conduct a logistic multiple regression analysis and a covariance analysis (ANCOVA) of the demographic and therapeutic variables collected from the electronic medical records and telephone surveys.

Results : 1. A longer duration of hospitalization was significantly better for the maintenance of pain relief or a decrease in the pain after discharge.

2. Younger patients were significantly less likely to be treated with a Western medical treatment after discharge.

3. Most of the demographic and therapeutic variables were not statistically significant in regards to treatment for lower back pain since discharge.

Conclusion : Some of the demographic and therapeutic variables had a positive effect on the prognosis at one year or greater in patients who received integrative Korean medical treatment for lumbar disc herniation. Continued and systematic research will be needed.

Key words :
Herniation of lumbar disc;
Korean medical treatment;
Retrospective statistical analysis;
Logistic multiple regression analysis;
Analysis of covariance (ANCOVA)

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Ⅰ. Introduction

The "2015 Health Insurance Statistical Yearbook" indicated that 1,886,452 patients were treated for lumbar intervertebral disc herniation (M51.0 other intervertebral disc disorders), making it the fifth most common musculoskeletal disease in Korea[1-6] (Table 1; Fig. 1). Lumbar intervertebral disc herniation is the most common cause of lower back and radiating leg pain, and is caused by a combination of various factors, such as trauma, smoking, vibration, repetitive micro-injury, and mental problems[7].

Patients with severe lumbar intervertebral disc herniation may be treated with surgical intervention, such as a nerve block, discectomy, and spinal fusion; however, it is also well known that conservation treatment alone has great therapeutic effect in approximately 60 to 90% of cases of lumbar disc herniation[8]. In a Korean medicine clinic, lumbar disc herniation is generally treated with various conservative non-surgical treatments, including acupuncture, moxibustion, bee venom pharmacopuncture, and chuna by the Department of Acupuncture & Moxibustion (Dept. of Acu. & Moxi.).

Most patients with lumbar disc herniation in a Korean medicine hospital are diagnosed with herniated intervertebral disc (HIVD) via magnetic res-

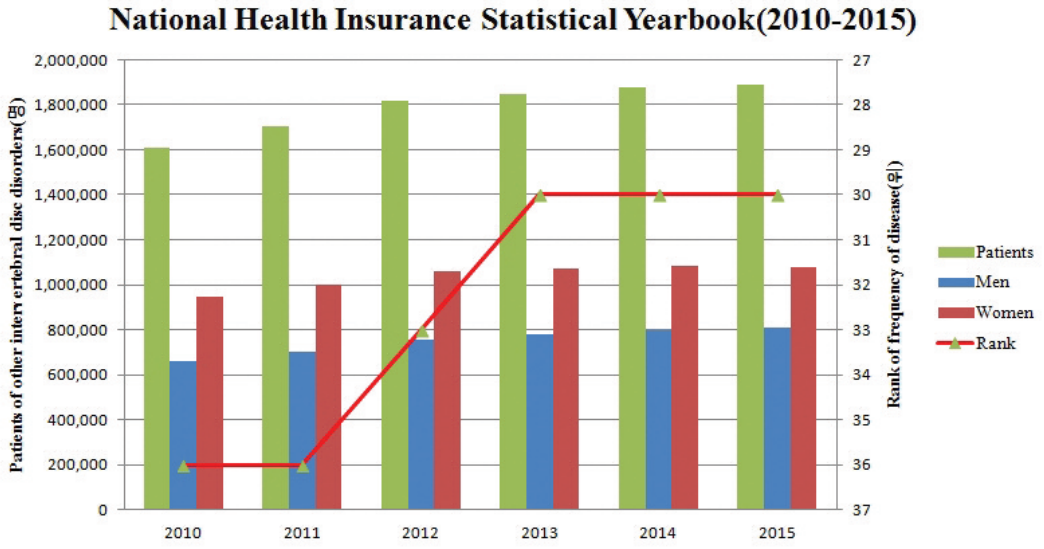

Fig. 1. The change of rank and patients of other intervertebral disc disorders(M51.0) at National Health Insurance Statistical Yearbook by year (2010~2015)[1-6]

Table 1. The rank and patients of other intervertebral disc disorders(M51.0) at National Health Insurance Statistical Yearbook by year (2010~2015)[1-6]

	Year	Rank	Patients	Men	Women
M51.0 Other intervertebral disc disorders	2010	36	1,609,060	662,610	946,450
	2011	36	1,702,638	703,200	999,438
	2012	33	1,815,448	754,188	1,061,260
	2013	30	1,847,234	777,797	1,069,437
	2014	30	1,879,098	798,063	1,081,035
	2015	30	1,886,452	811,488	1,074,964

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onance imaging (MRI). Those having difficulty with daily living due to the severe pain are admitted for inpatient treatment. Several studies have demonstrated the efficacy of Korean medicine in patients with lumbar disc herniation, such as those by Jung[9] and Jung[10]. The herniation is naturally reduced through conservative treatment[12]; however, the pain easily recurs due to the repetition of the wrong habits. In Western medicine, many studies have investigated the prognosis and failure rates of surgical treatment for herniated lumbar discs[13–17]. In Korean medicine, some studies have investigated the prognosis in terms of a patient's pain level or persistence of treatment after treatment with Korean medicine[9–11]. However, studies analyzing a correlation of factors that may affect prognosis are rare.

The purpose of this study was to retrospectively evaluate the prognostic factors in patients 2 years after being discharged from a hospital stay in 2014 at the Dunsan Korean medical hospital for inpatient treatment by the Department of Acupuncture & Moxibustion. We investigated whether a patient diagnosed with lumbar disc herniation and certain prognostic factors was effectively treated with Korean medicine that had continued therapeutic effect. Furthermore, we wanted to contribute towards the development of treatment with Korean medicine.

II. Methods

1. Participants and variables

We selected patients who had been hospitalized and treated for lumbar intervertebral disc herniation for more than 2 days during a one-year period from January 1, 2014, to December 31, 2014, at the Department of Acupuncture & Moxibustion of the Dunsan Korean medicine hospital of Daejeon University. Most of the patients with lumbar intervertebral disc herniation were treated in the Dept. of Acu. & Moxi.; therefore, from the entire population of inpatients, we surveyed those who had been admitted to the Dept. of Acu. & Moxi. If a patient was re-admitted within one year, the total number of days of admission to the hospital during that one year were combined. Patients who were unable to have their current status checked due to death, being missing, or a change in their contact information during the telephone survey were excluded (Fig. 2).

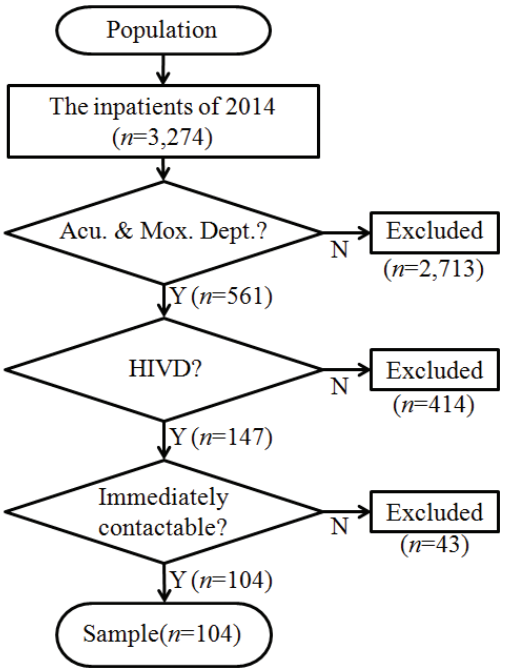

Fig. 2. Flowchart of process of sample extracting

The collected variables were classified into either demographic (age, sex, occupation, smoking history, and drinking history at admission) or therapeutic variables (patient's disease duration, injection or operation before hospitalization, severity of disease, whether acupotomy was performed, and whether bee venom pharmacopuncture was performed).

2. Statistical analysis

The data used for this study were collected through medical records and telephone interviews (Appendix 1). The statistical analysis was performed using

IBM SPSS 21.0. First, the characteristics of the subjects were analyzed by analyzing the frequency and descriptive statistics of the demographic variables and therapeutic variables. Since the dependent variable is dichotomous, a multiple logistic regression was used to identify the variables that affect the dependent variables and backward elimination was used for variable selection.

In order to evaluate the effectiveness of Korean medicine through hospitalization, the degree of improvement was defined using three categories of improvement maintenance patterns. One-hundred-four samples were divided into two groups and were analyzed according to three improvement maintenance patterns as follows:

1) Improvement maintenance patterns

(1) Improvement pattern 1:

The difference between the current Visual Analogue Scale (VAS) score and the score at discharge was less than 0 ('current VAS' - 'discharge VAS' ≦ 0)

(2) Improvement pattern 2:

No injection (Inj.) or surgery (Op.) had been received since discharge

(3) Improvement pattern 3:

No back pain treatment had been recently received

2) Group classification and analysis

First, based on Improvement pattern 1, 104 samples were divided into a group with reduced pain and non-reduced pain. Based on Improvement pattern 2, 104 samples were divided into an Inj. or Op. treatment group and a non-Inj. or non-Op. treatment group. Finally, based on Improvement pattern 3, 104 samples were divided into a group treated for lower back pain and a group without.

The Analysis of Covariance (ANCOVA) was used to analyze the mean differences in the lumbar range of motion (ROM; flexion [°] and extension [°] and the Straight Leg Raise [SLR] test [°]) between admission and discharge.

The significance level of all statistical analyses used in this study was set based on the commonly used 5% (α = 0.05).

Ⅲ. Results

1. Frequency analysis and descriptive statistics of patients

Table 2 shows the frequency analysis and descriptive statistics for the demographic variables. A total of 104 subjects were surveyed and there were 36 men (34.6%) and 68 women (65.4%). Fifty-two patients (50.0%) were unemployed (including a homemaker), 19 patients (18.3%) had office jobs, 13 patients (12.5%) had jobs requiring physical labor, 14 patients (13.5%) were self-employed, 2 patients (1.9%) were drivers, and 4 patients (3.8%) were students. Thirteen patients (12.5%) were smokers and 91 patients (87.5%) were non-smokers at admission. Eighteen patients (16.3%) answered that they had a history of consuming alcohol and 87 patients (83.7%) did not. Finally, the mean age of the patients was 48.01 years old. The youngest patient was 20 years old, and the eldest was 79 years old (Fig. 3).

Table 3 shows the frequency analysis and descriptive statistics for the therapeutic variables. First, regarding the onset of lower back pain or radiating leg pain, 32 patients (30.8%) were in the acute phase (within 4 weeks), 37 patients (35.5%) in the subacute phase (4 to 12 weeks), and 35 patients (33.7%) in the chronic phase (12 weeks or more). Forty-six patients (44.2%) answered yes to having a history of Western medical treatment before admission to the Dunsan Korean medicine hospital and 58 patients (55.8%) answered no. The severity of the lumbar intervertebral disc herniation was given the following rating based on the radiological findings: mild (bulging disc; 11

Table 2. Frequency analysis and descriptive statistics of demographic variables

Independent variable	Item	Frequency	%
Sex	Male	36	34.6
	Female	68	65.4
Occupation	Unemployed(including homemaker)	52	50
	Office job	19	18.3
	Jobs requiring physical labor	13	12.5
	Self-employed	14	13.5
	Driver	2	1.9
	Student	4	3.8
Smoking history	Yes	13	12.5
	No	91	87.5
a history of consuming alcohol	Yes	17	16.3
	No	87	83.7
Age	48.01±14.550 (min=20, max=79)		

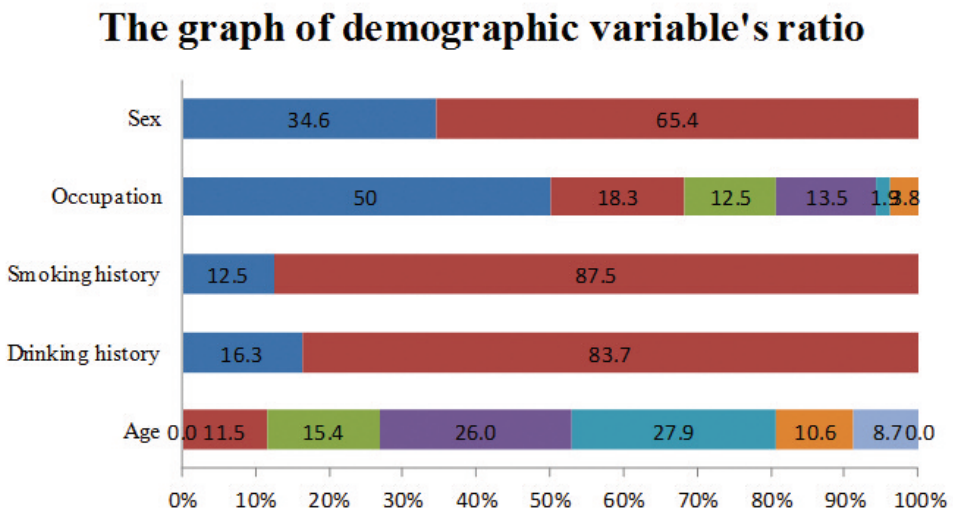

Fig. 3. The graph of demographic variable's ratio

patients [10.6%]) and moderate (over protrusion; 93 patients [89.4%]). During the inpatient treatment period, 22 patients (21.2%) received an acupotomy and 82 patients (78.8%) did not and 52 patients (50.0%) received a bee venom pharmacopuncture treatment, while 52 patients (50.0%) did not. Next, 13 patients (12.5%) answered yes to an injection or operation for treatment after discharge and 91 patients (87.5%) did not. Seventy-three patients (70.2%) answered that they continued to have lower back pain after discharge and 31 patients (29.8%) did not. After discharge, 46 patients (44.2%) answered that they were still being treated for lower back pain and 58 patients (55.8%) were not. Thirty-seven patients (35.6%) answered that they would be treated at a Korean hospital if they had recurring lower back pain due to lumbar intervertebral disc herniation, 31 patients (29.8%) an-

Table 3. Frequency analysis and descriptive statistics of therapeutic variables

Independent variable	Item	Frequency	%
Disease duration	Acute	32	30.8
	Subacute	37	35.5
	Chronic	35	33.7
Injection or operation before hospitalization	Yes	46	44.2
	No	58	55.8
Severity of disease	Slight	11	10.6
	Moderate	93	89.4
Acupotomy	Yes	22	21.2
	No	82	78.8
Bee venom pharmacopuncture	Yes	52	50
	No	52	50
Injection or operation after discharge	Yes	13	12.5
	No	91	87.5
Presence of current pain	Yes	73	70.2
	No	31	29.8
Receiving current treatment or not	Yes	46	44.2
	No	58	55.8
Re-hospitalization intention	Yes	37	35.6
	No	31	29.8
	Unknown	36	34.6
Hospitalization	17.62±11.562 (min=2, max=61)		
The number of outpatient treatments	3.14±10.326 (min=0, max=95)		
Current VAS	4.58±3.486 (min=0, max=10)		
Discharge VAS	5.23±2.872 (min=1, max=10)		

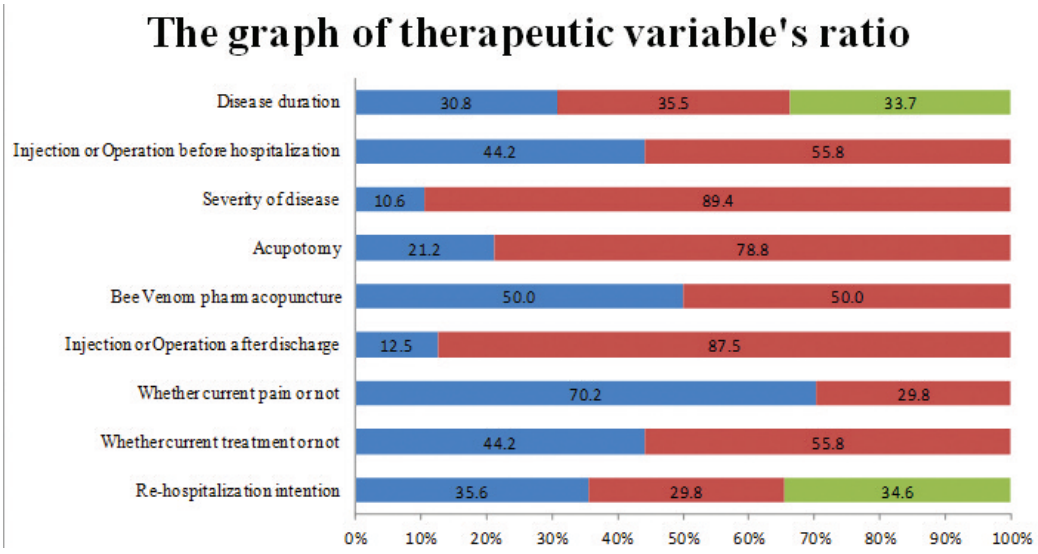

Fig. 4. The graph of therapeutic variable's ratio

swered that they would not, and 36 patients (34.6%) answered that they do not know. Finally, the average number of hospitalization days was 17.62 days, ranging from 2 to 61 days, and the average number of outpatient visits after discharge was 3.14 times, ranging from 0 to 95 times. In addition, the mean VAS at discharge was 5.23, ranging from 1 to 10, and the average current VAS was 4.58, ranging from 0 to 10 (Fig. 4).

2. Logistic multiple regression analysis using backward elimination for Improvement pattern 1

1) Demographic variables

Table 4 shows the results of the logistic regression analysis using backward elimination for Improvement pattern 1 with regards to the demographic variables. There were no variables with a significant effect in the initial model. Removing variables using the backward elimination method showed that there was no statistically significant effect for Improvement pattern 1.

2) Therapeutic variable

Table 5 shows the results of a logistic regression analysis using backward elimination for Improvement pattern 1 according to the therapeutic variables. There are no variables with a significant effect in the initial model. As a result of removing the variables using the backward elimination method, the variable statistically affecting Improvement pattern 1 was the number of hospitalization days per year (Exp(B) = 0.955, $p < 0.5$). Therefore, the number of hospitalization days per year had a negative effect on Improvement pattern 1. In other words, as the number of hospitalization days per year increased by 1 day, the Improvement pattern 1 measurements decreased by 0.955 times. This suggests that patients with longer hospitalization days are more likely to have sustained pain relief or to have been steadily relieved from pain.

Table 4. Improvement pattern 1 by demographic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 1	Initial	Age	1.022	0.241
		Sex	0.553	0.389
		Occupation (Unemployed)	–	0.337
		Occupation (Office job)	2.978	0.171
		Occupation (Jobs requiring physical labor)	1.159	0.849
		Occupation (Self-employed)	0.393	0.21
		Occupation (Driver)	1.827	0.999
		Occupation (Student)	1.433	0.783
		Smoking history	0.233	0.13
		Drinking history	1.89	0.437
		(an invariable)	0.776	0.847
	Final	(an invariable)	1.537*	0.032

Occupation dummy processed based on unemployed.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 5. Improvement pattern 1 by therapeutic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 1	Initial	Disease duration (Acute)	–	0.831
		Disease duration (Subacute)	0.755	0.599
		Disease duration (Chronic)	0.996	0.994
		Injection or Operation before hospitalization	1.141	0.764
		Hospitalization	0.951	0.017
		The number of outpatient treatment	1.022	0.476
		Severity of disease	0.989	0.987
		Acupotomy	0.489	0.187
		Bee Venom pharmacopuncture	0.926	0.864
		(an invariable)	4.500	0.103
	Final	Hospitalization	0.955*	0.015
		(an invariable)	3.532†	0.002

Disease duration dummy processed based on acute.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

3. Logistic multiple regression analysis using backward elimination for Improvement pattern 2

1) Demographic variable

Table 6 shows the results of a logistic regression using backward elimination for Improvement pattern 2 with regards to the demographic variables. There were no variables with a significant effect in the initial model. Removing the variables using backward elimination resulted in age as the variable statistically affecting Improvement pattern 2 (Exp(B) = 0.960, $p < 0.5$). Age had a negative effect on Improvement pattern 2. In other words, as age increased, the measurements for Improvement pattern 2 decreased by 0.960 times, suggesting that after discharge from the Korean medicine hospital, younger patients were less likely to receive Western medical treatment, such as an injection or surgery, for their lumbar intervertebral disc.

2) Therapeutic variable

Table 7 shows the results of the logistic regression analysis using the backward elimination method for Improvement pattern 2 with regards to the therapeutic variables. There were no variables with a significant effect in the initial model and there were no statistically significant effects of Improvement pattern 2 as a result of removing the variables using backward elimination.

4. Logistic multiple regression analysis using backward elimination for Improvement pattern 3

1) Demographic variable

Table 8 shows the results of the logistic regression analysis using backward elimination for Improvement pattern 3 based on the demographic variables. There were no variables with a signifi-

Table 6. Improvement pattern 2 by demographic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 2	Initial	Age	0.98	0.412
		Sex	0.249	0.382
		Occupation (Unemployed)	–	0.982
		Occupation (Office job)	2.07	0.998
		Occupation (Jobs requiring physical labor)	4.021	0.999
		Occupation (Self-employed)	0.454	0.398
		Occupation (Driver)	2.475	0.999
		Occupation (Student)	2.865	0.999
		Smoking history	0.167	0.339
		Drinking history	0.55	0.719
		(an invariable)	53.691	0.067
	Final	Age	0.960*	0.049
		(an invariable)	57.769‡	0.001

Occupation dummy processed based on unemployed.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 7. Improvement pattern 2 by therapeutic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 2	Initial	Disease duration (Acute)	–	0.903
		Disease duration (Subacute)	0.846	0.824
		Disease duration (Chronic)	1.198	0.823
		Injection or Operation before hospitalization	1.158	0.818
		Hospitalization	0.991	0.751
		The number of outpatient treatment	1.117	0.317
		Severity of disease	2.262	0.374
		Acupotomy	2.637	0.184
		Bee Venom pharmacopuncture	0.827	0.767
		(an invariable)	1.628	0.306
	Final	(an invariable)	7.000‡	0.001

Disease duration dummy processed based on acute.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 8. Improvement pattern 3 by demographic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 3	Initial	Age	1.01	0.571
		Sex	0.492	0.255
		Occupation (Unemployed)	–	0.977
		Occupation (Office job)	0.767	0.72
		Occupation (Jobs requiring physical labor)	0.997	0.997
		Occupation (Self-employed)	0.556	0.423
		Occupation (Driver)	0	0.999
		Occupation (Student)	1.068	0.959
		Smoking history	1.352	0.736
		Drinking history	0.674	0.592
		(an invariable)	0.949	0.966
	Final	(an invariable)	0.793	0.24

Occupation dummy processed based on unemployed.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 9. Improvement pattern 3 by therapeutic variables

Dependent variable	Model	Independent variable	Exp(B)	*p*
Improvement pattern 3	Initial	Disease duration (Acute)	–	0.14
		Disease duration (Subacute)	2.327	0.109
		Disease duration (Chronic)	0.884	0.812
		Injection or Operation before hospitalization	1.037	0.933
		Hospitalization	1.014	0.469
		The number of outpatient treatment	0.998	0.933
		Severity of disease	1.013	0.985
		Acupotomy	1.735	0.297
		Bee Venom pharmacopuncture	0.78	0.57
		(an invariable)	0.554	0.744
	Final	(an invariable)	1.261	0.24

Disease duration dummy processed based on acute.
* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

cant effect in the initial model, and there was no statistically significant effect on Improvement pattern 3 as a result of removing the variables using backward elimination.

2) Therapeutic variable

Table 9 shows the results of the logistic regression analysis using backward elimination for Improvement pattern 3 with regards to the

therapeutic variables. There were no variables with a significant effect in the initial model, and there were no statistically significant effects on Improvement pattern 3 as a result of removing the variables using backward elimination.

5. Analysis of covariance (ANCOVA) and average estimation for Improvement pattern 1

The group was divided into a pain reduction and non-pain reduction sub-groups. After treatment with Korean medicine, the mean difference of the flexion, extension, and SLR test was not statistically significant between the pain reduction and non-pain reduction groups (Table 10).

Table 11 shows the mean estimates of the ANCOVA results for Improvement pattern 1. The average value of the lumbar flexion at admission was estimated to be 64.47. After discharge, the pain reduction group increased to 68.32 and the non-reduced in pain group increased to 73.32; this was not significantly different. Next, the average value of the lumbar extension at admission was estimated to be 22.74. After discharge, the pain reduction group increased to 25.63, and the non-pain reduction group increased to 27.08, but there

Table 10. ANCOVA result by Improvement pattern 1

Dependent variable	Source	SS	df	MSE	F	η^2
Flexion	Intercept	19502.625	1	19502.625	90.065‡	0.471
	Covariate	22357.444	1	22357.444	103.248‡	0.506
	TRT	608.306	1	608.306	2.809	0.027
	Error	21870.604	101	216.541		
Extension	Intercept	4402.871	1	4402.871	121.365‡	0.546
	Covariate	3507.224	1	3507.224	96.677‡	0.489
	TRT	50.826	1	50.826	1.401	0.014
	Error	3664.069	101	36.278		
SLR Test	Intercept	11284.267	1	11284.267	88.163‡	0.466
	Covariate	10407.215	1	10407.215	81.310‡	0.446
	TRT	32.304	1	32.304	0.252	0.002
	Error	12927.376	101	127.994		

* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 11. Estimated average by Improvement pattern 1

Dependent variable	Group	Adjusted mean at discharge	Covariate at admission
Flexion	Reduced in pain (n=63)	68.32	64.47
	Non-reduced in pain (n=41)	73.32	
Extension	Reduced in pain (n=63)	25.63	22.74
	Non-reduced in pain (n=41)	27.08	
SLR Test	Reduced in pain (n=63)	71.61	67.6
	Non-reduced in pain (n=41)	72.77	

was no significant difference. Finally, the average value of the SLR test at admission was estimated to be 67.60. After discharge, the pain reduction group increased to 71.61 and the non-pain reduction group increased to 72.77, but there was no significant difference.

6. Analysis of covariance (ANCOVA) and average estimation for Improvement pattern 2

The group was divided into the Inj. or Op. treatment group and non-Inj. or non-Op. treatment sub-group. After treatment with Korean medicine, the mean difference of the flexion, extension, and SLR test was not statistically significant between the Inj. or Op. treatment group and the non-Inj. or non-Op. treatment group (Table 12).

Table 13 shows the mean estimates of the ANCOVA results for Improvement pattern 2. The average value for lumbar flexion was estimated at admission to be 64.47. After discharge, the Inj. or Op. treatment group increased to 70.27, and the non-Inj. or non-Op. treatment group increased to 70.44, but there was no statistical difference. Next,

Table 12. ANCOVA result by Improvement pattern 2

Dependent variable	Source	SS	df	MSE	F	η^2
Flexion	Intercept	17291.604	1	17291.604	77.694‡	0.435
	Covariate	21713.208	1	21713.208	97.561‡	0.491
	TRT	0.36	1	0.36	0.002	0.001
	Error	22478.551	101	222.56		
Extension	Intercept	3719.447	1	3719.447	101.258‡	0.501
	Covariate	3382.342	1	3382.342	92.081‡	0.477
	TRT	4.929	1	4.929	0.134	0.001
	Error	3709.966	101	36.732		
SLR Test	Intercept	10590.754	1	10590.754	83.537‡	0.453
	Covariate	9963.466	1	9963.466	78.589‡	0.438
	TRT	155.015	1	155.015	1.223	0.012
	Error	12804.665	101	126.779		

* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 13. Estimated average by Improvement pattern 2

Dependent variable	Group	Adjusted mean at discharge	Covariate at admission
Flexion	Inj. or Op. treatment (n=13)	70.44	64.47
	Non-Inj. or non-Op. treatment (n=91)	70.27	
Extension	Inj. or Op. treatment (n=13)	25.62	22.74
	Non-Inj. or non-Op. treatment (n=91)	26.29	
SLR Test	Inj. or Op. treatment (n=13)	75.33	67.6
	Non-Inj. or non-Op. treatment (n=91)	71.6	

Inj. = Injection, Op. = Operation

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the average value of lumbar extension at admission was estimated to be 22.74. After discharge, the Inj. or Op. treatment group increased to 26.29, and the non-Inj. or non-Op. treatment group increased to 25.62, but there was no statistical difference. Finally, the average value of the SLR test at admission was estimated to be 67.60. After discharge, the Inj. or Op. treatment group increased to 71.60, and the non-Inj. or non-Op. treatment group increased to 75.33, but there was no significant difference.

7. Analysis of covariance (ANCOVA) and average estimation for Improvement pattern 3

The group was divided into a group with treatment for lower back pain (LBP) and a group without treatment for LBP. After treatment with Korean medicine, the mean difference for the flexion, extension, and SLR test between the LBP treatment group and non-LBP treatment group was not statistically significant (Table 14).

Table 15 shows the mean estimates of the ANCOVA results for Improvement pattern 3. The av-

Table 14. ANCOVA result by Improvement pattern 3

Dependent variable	Source	SS	df	MSE	F	η^2
Flexion	Intercept	19008.108	1	19008.108	86.680‡	0.462
	Covariate	22049.903	1	22049.903	100.551‡	0.499
	TRT	330.612	1	330.612	1.508	0.015
	Error	22148.298	101	219.29		
Extension	Intercept	4383.478	1	4383.478	121.187‡	0.545
	Covariate	3458.188	1	3458.188	95.606‡	0.486
	TRT	61.595	1	61.595	1.703	0.017
	Error	3653.3	101	36.171		
SLR Test	Intercept	10230.005	1	10230.005	81.071‡	0.445
	Covariate	10723.749	1	10723.749	84.984‡	0.457
	TRT	214.97	1	214.97	1.704	0.017
	Error	12744.71	101	126.185		

* $p<0.5$, † $p<0.1$, ‡ $p<0.01$

Table 15. Estimated average by Improvement pattern 3

Dependent variable	Group	Adjusted mean at discharge	Covariate at admission
Flexion	L.B.P. treatment (n=46)	68.28	64.47
	Non-L.B.P treatment (n=58)	71.89	
Extension	L.B.P. treatment (n=46)	25.34	22.74
	Non-L.B.P treatment (n=58)	26.89	
SLR Test	L.B.P. treatment (n=46)	70.41	67.6
	Non-L.B.P treatment (n=58)	73.38	

erage value of the lumbar flexion at admission was estimated to be 64.47. After discharge, the non-LBP treatment group increased to 71.89 and the LBP treatment group increased to 68.28, but there was no significant difference. Next, the average value of the lumbar extension at admission was estimated to be 22.74. After discharge, the non-LBP treatment group increased to 26.89 and the LBP treatment group increased to 25.34, but there was no significant difference. Finally, the average value of the SLR test at admission was estimated to be 67.60. After discharge, the non-LBP treatment group increased to 73.38 and the LBP treatment group increased to 70.41, but there was no significant difference.

Ⅳ. Discussion

Lumbar intervertebral disc herniation is one of the most common degenerative diseases that can cause lower back pain and radiating leg pain[18]. This is a pathological condition that frequently affects the spine of young and middle-aged adults[19]. It is defined as the dislocation of the intervertebral disc components (nucleus pulposus or annulus fibrosus) beyond the space between the vertebral bodies[19-22]. The most common symptoms of lumbar intervertebral disc herniation are lower back pain, radiating leg pain, sensory abnormalities (paresthesia, numbness and tingling), lower limb weakness, and, occasionally, incontinence[23]. Symptomatic lumbar intervertebral disc herniation appears in 1% to 2% of the total population[24]. Approximately 90% of the cases radiculopathy are caused by a herniation of the lumbar intervertebral disc, making it the most common cause[25,26]. The highest prevalence is seen in the 30- to 50-year-old age group. Men were twice as likely as women to have a higher prevalence rate[27]. In adults aged 25 to 55 years, about 95% of lumbar intervertebral disc herniation mostly occur in the L4 to L5 and L5 to S1 spinal levels. Lumbar intervertebral disc herniation above the L4 spine level is more common in adults over 55 years old[23].

Lumbar intervertebral disc herniation is the most common limitation to activity in people under 45 years of age[28]. Moreover, this is the most common cause of lower back pain and radiating leg pain, resulting in high personal and social costs[29-31].

Since the introduction of lumbar discetomy[32], surgical intervention has been performed in most lumbar intervertebral disc herniation patients. However, various conservative interventions have been introduced in recent years: thus, patients are treated early and are actively involved in therapy. Early recovery of function and prevention of recurrence are the most important goals and so are considered to be a desirable treatment direction[33,34].

Korean medicine treatment for patients with lumbar intervertebral disc herniation has also recently become popular, and to date, many studies have shown that patients with lumbar intervertebral disc treated with Korean medicine have had a significant improvement in pain[9-11]. According to Kim's[35] study and from the 2010 to 2015 with the National Health Insurance Statistical Yearbook[1-6], the number of patients receiving inpatient treatment for lumbar intervertebral disc herniation in Korean medical institutions is gradually increasing (Fig. 5).

Likewise, the number of patients with lumbar intervertebral disc herniation who receive conservative treatment in Korean medical institutions is gradually increasing. Therefore, it is important to improve the competitiveness of treatment with Korean medicine for lumbar intervertebral disc herniation. The patients who received inpatient treatment at Korean medicine hospital were studied, and the prognostic factors of patients who maintained an improvement for more than 1 year were identified. It is necessary to analyze the characteristics of patients that had relatively effective improvements from treatment with Korean medicine.

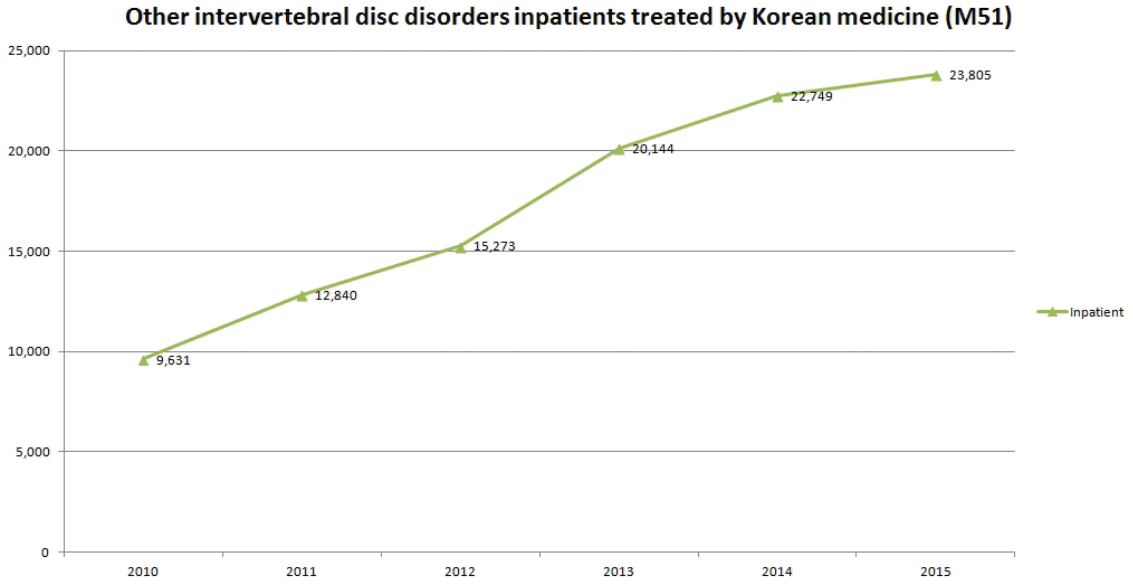

Fig. 5. The change of inpatient of other intervertebral disc disorders(M51.0) at National Health Insurance Statistical Yearbook by year (2010~2015)[1-6]

This study investigated patients admitted to the Dept. of Acu. & Moxi. at the Dunsan Korean medicine hospital of Daejeon University for more than 2 days in 2014 and analyzed their demographic variables, including sex, age, and occupation, as well as, therapeutic variables, including the duration and severity of the disease. This study was conducted to improve the competition over the treatment at the Korean medicine hospital for patients with lumbar disc herniation.

Among the 3,274 patients admitted to Dunsan Korean medicine hospital of Daejeon Univ., 561 patients were admitted to the Dept. of Acu. & Moxi. Among them, 147 patients were diagnosed with lumbar intervertebral disc herniation and received inpatient treatment. All patients that were not admitted for more than 2 days, could not be contacted, or had since died were excluded. If the same patient was re-admitted more than twice in 2014, the total number of hospital days during the one year were added up. As a result, a total 104 patients were hospitalized for more than 2 days with lumbar intervertebral disc herniation at the Department of Acu. & Moxi. of Dunsan Korean medicine hospital in 2014 (Fig. 2). There was a higher proportion of women in the study population. This seems to be a result of the higher prevalence of chronic diseases in women than in men, as seen in a number of the studies, as well as a higher level of subjective unhealthiness and preference to use Korean medicine services than men[36-39].

The mean age of the patients was 48.01 years and the largest age group was the 40- to 50-year-old group, which accounted for 53.9% of the study population. The prevalence rate in the 30's age group was 15.4%. This is similar to the results of a study that suggested the highest prevalence is seen in the 30-50 age group[27]. It is also thought to be partially related to the recent increase in the utilization of Korean medicine services by patients in their 40's[36,40].

Fifty-two patients were unemployed, which accounted for 50% of the total study population. Although men were evenly distributed among the various occupational groups, 48 women (70.6%) were unemployed. As shown in Tables 4, 6, and 8, it is difficult to say that occupation was a statistically influential variable in the persistence effect of

treatment in patients receiving Korean medicine treatment. However, in this study, it was difficult to distinguish whether patients were already unemployed or became unemployed because of the pain. Therefore, further research is necessary to determine the relationship between unemployment and pain.

To evaluate the situation where patients maintained a state of improvement with Korean medicine, we evaluated each of the 104 patients with three hypotheses using the VAS scores to indicate the patient's current degree of lower back pain: 1) the difference in VAS scores between the present time and discharge was less than 0; 2) they received no injections or surgery since discharge; and 3) they received no recent treatment for back pain. We confirmed the relationship between these and the demographic and therapeutic variables.

The results of the logistic multiple regression analysis that compared the degree of improvement with regards to the demographic variables through changes in VAS or whether they recently received treatment for lower back pain showed no significant differences between the groups. However, as the age increased, the probability of receiving less Western treatment, such as an injection or surgery, was 0.960 times lower than after receiving Korean medicine treatment. In other words, as a patients' age decreased by one year, patients would receive Western medical treatment 1.042 times significantly less after Korean medicine treatment with lumbar intervertebral disc herniation (Table 6).

When using logistic multiple regression to compare the degree of the improvement pattern with regards to the therapeutic variables with whether they received Western medical treatment, such as an injection or operation, or whether they recently received lower back pain treatment, the difference between the groups was not statistically significant. However, as the duration of hospitalization increased by 1 day, the VAS difference decreased by 0.955 times. In other words, patients with longer hospitalization days were significantly more likely to gradually relieve their pain or maintain their improvement (Table 5).

It was difficult to determine whether the degree of the lumbar ROM or SLR test maintained the same degree or increased during hospitalization using the ANCOVA and mean estimation.

The purpose of this study was to analyze the relationship between the variables and prognosis of the patients treated for a herniated lumbar intervertebral disc by the Department of Acu. & Moxi. of Dunsan Korean medicine hospital of Daejeon Univ. in 2014 using a retrospective statistical analysis. It seems necessary to improve pain relief and patient satisfaction by developing and improving Korean medical services by analyzing the factors that have a positive effect on the prognosis of patients treated with lumbar intervertebral disc herniation. However, this study has limitations in that the level of significance could be somewhat lower since data were collected based on two-year-old medical records and patient statements. Therefore, there might be a mixture of slightly unclear information. In addition, since this study was not a prospective study, but was a retrospective chart review study, the main treatments such as acupuncture, pharmacopuncture, and herbal medicine were the same, but the specific treatment, such as the kind of herbal medicine, number of pharmacopuncture treatments, were not controlled, so the possibility to study various variables was limited. This study was a retrospective analysis conducted at just one university hospital, so expanding the sample population in the future is necessary. We hope that further research could clarify the relationship between various variables and make a prognosis through more systematic planning from the beginning of the study.

V. Conclusion

From January 1, 2014, to December 31, 2014, the relationship between the demographic and thera-

peutic variables of patients admitted to the Department of Acu. & Moxi. of Dunsan Korean medicine hospital of Daejeon Univ. for lumbar intervertebral disc herniation for more than 2 days were analyzed and the results are as follows:

1. The analysis of the relationship between maintaining pain relief and the variables showed that patients with a longer hospitalization at a Korean medicine hospital are significantly more likely to maintain their state of steady pain relief state.
2. The analysis of the relationship between the patient variables and whether patients sought Western medicine treatment after discharge showed that younger patients were significantly less likely to receive Western medical treatment for lumbar intervertebral disc.
3. In the analysis of the relationship between whether patients have continuously received treatment for their lower back pain and their variables, it was difficult to identify statistically significant variables.

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Appendix 1.

대전대학교 둔산한방병원

2014년 요추 추간판 탈출증 입원환자 현재 상태 확인을 위한 전화 설문지

ver. 1.0
2016.10.01

퇴원 후 전화설문 대본

안녕하세요? 대전대 둔산한방병원 침구과에서 연락드렸습니다.
2014년 OO월경 허리 디스크 증상(요추 추간판 탈출증)으로 입원 치료 받으신 OOO님 맞으신가요?
퇴원하신 이후의 현재 허리 상태와 치료까지 치료를 지속하고 계신지 등 전반적인 예후 확인을 위한 설문을 진행하고 있습니다.
질문을 잘 들으시고, 선생님의 현재 상태를 기준으로 대답해주시면 됩니다. 설문 시작하겠습니다.

1. 퇴원 이후 정형외과, 신경외과, 통증의학과 등의 양방 병원에 내원하여 시술 또는 수술을 받으신 적이 있으십니까?
(예 / 아니오)

2. 현재까지 요통 또는 하지 방사통이 지속되고 계십니까?
(예(→2-1.) / 아니오(→3.))

2-1. 0은 통증이 없음을, 5는 중등도 통증을, 10은 상상할 수 없는 정도로 심한 통증을 의미한다면,
나는 현재 ( )점의 통증을 느끼고 있다.

2-2. 최근 3개월 이내에 요통 또는 하지 방사통이 재발하여 주 2회 이상 치료를 받은 적이 있습니까?
(예 / 아니오)

3. 허리 디스크 증상 재발 시, 본원에서 다시 입원치료를 받아보실 의사가 있으십니까?
(예 / 아니오)

허리 디스크 증상은 재발이 쉬워 관리가 중요하니, 무리한 활동 삼가시되 허리 강화 운동을 통해 관리를 꼭 하시기 바랍니다.
설문에 응해주셔서 감사합니다.

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