

## **Rehabilitation therapy utilization in patients with Parkinson disease in Korea**

Han Gil Seo<sup>1\*†</sup>, Sang Jun Park<sup>2,3</sup>, Jiah Seo<sup>2</sup>, Seong Jun Byun<sup>2</sup>, Byung-Mo Oh<sup>2</sup>

Seoul National University College of Medicine, Seoul National University Hospital, Department of Rehabilitation Medicine<sup>1</sup>, Graduate School, University of Ulsan, Interdisciplinary Program of Medical & Biological Engineering<sup>2</sup>, School of Electrical Engineering, University of Ulsan, Biomedical Engineering<sup>3</sup>

### **Background**

Recent evidence and guidelines recommend appropriate rehabilitation from the beginning of diagnosis in patients with Parkinson disease (PD). Although rehabilitation for PD may not be adequately provided in Korea, there is no information about rehabilitation therapy utilization in these patients.

### **Objectives**

The Purpose of this study is to investigate the utilization of rehabilitation therapy in patients with PD and to analyze the patients' characteristics associated with it.

### **Materials and Methods**

We used the National Health Insurance Service-National Sample Cohort (NHIS-NSC) for 2002-2015, including total 1,000,000 sampled from a target population of 48,222,537 individuals in the 2006 NHI Database. We identified cases with Parkinson disease using the registration code for PD (V124), from the registration program for cancer and 62 rare intractable diseases initiated in 2004, in every 3 years. Therefore, these prevalent cases were divided into 4 groups according to the period: 2004-2006, 2007-2009, 2010-2012, and 2013-2015. Among them, we excluded individuals who had diagnostic claims for other parkinsonisms (G21, G22, and G23) and who had no prescription of antiparkinson medication. We assessed utilization of rehabilitation therapies by identifying claims having procedure codes for physical therapy (PT), occupational therapy (OT), and swallowing therapy (ST) in each 3-year study period. Demographic data, comorbidities which might require rehabilitation, and prescribed antiparkinson medications were also identified. The effect of patients' characteristics on rehabilitation therapy utilization was investigated multivariable logistic regression analysis in the period of 2013-2015.

### **Results**

PD patients who met the inclusion and exclusion criteria were identified as 384 in 2004, 855 in 2007, 1,023 in 2010, and 1,222 in 2013 (Table 1). The numbers of physiatrist visits were 221 (0.58 per person) in 2004-2006, 824 (0.96 per person) in 2007-2009, 2013 (1.97 per person) in 2010-2012, and 3550 (2.91 per person) in 2013-2015. Among these patients, 35-40% had claims for PT, 16-19% had claims for OT, and 4-6% had claims for ST without remarkable differences between the study periods (Fig. 1). The number of claims for each rehabilitation therapies is presented in Table 2. Female sex, age older than 70,

high income, severe disability, and high levodopa equivalent dose were significantly associated with rehabilitation therapy utilization in patients with PD.

### Conclusion

Although the number of physiatrist visits increased about 5 times over 10 years, the number of claims for PT, OT, and ST showed no change in patients with PD. According to recent evidence and guidelines, rehabilitation therapy utilization may be suboptimal in Korea. The associated patients' characteristics should be considered to provide adequate rehabilitation in these patients.

Table 1. Characteristics of patients with PD in each 3-year study period.

Characteristics	2004-2006		2007-2009		2010-2012		2013-2015	
	No	%	No	%	No	%	No	%
Total	384	100	855	100	1023	100	1221	100
Sex								
Male	141	37.68	321	37.54	401	39.20	483	39.56
Female	243	62.32	534	62.46	622	60.80	738	60.44
Age, y								
0-59	64	16.67	97	11.35	105	10.26	121	9.91
60-69	159	41.40	232	27.13	249	24.34	276	22.60
70-79	129	33.59	385	45.03	480	46.92	545	44.64
80+	32	8.33	141	16.49	189	18.48	279	22.85
Income								
N/A	0	0	95	11.11	77	7.53	74	6.06
Low	92	23.96	171	20.00	193	18.87	253	20.72
Middle	149	38.80	283	33.10	357	34.90	435	35.63
High	143	37.24	306	35.79	396	38.71	459	37.59
Region of residence								
Seoul/Incheon	96	25.00	211	24.68	252	24.63	293	24.00
Gyeonggi/Gangwon	84	21.88	187	21.87	240	23.46	314	25.72
Busan/Daegu/Ulsan/ Gyeongsang	91	23.70	215	25.15	262	25.61	328	26.86
Daejeon/Sejong/Chungcheong	45	11.72	96	11.23	116	11.34	105	8.60
Gwangju/Jeolla/Jeju	68	17.71	146	17.08	153	14.96	181	14.82
Number of visits								
Neurologists	6003		12546		16895		21652	
Physiatrists	221		824		2013		3550	

Table 2. Number of claims for each rehabilitation therapies. \*Simple therapeutic exercise (MM101) was excluded in this study because this code serves only 10 minutes of exercise, which is too short for the rehabilitation Purpose, and widely used in primary health care service for musculoskeletal problems.

Types of rehabilitation therapies		2004- 2006	2007- 2009	2010- 2012	2013- 2015
PT	Complex therapeutic exercise (MM102)	442	747	1226	1380
	Isokinetic therapeutic exercise (MM103)	0	10	66	146
	Rehabilitative development therapy for disorder of central nervous system (MM105)	656	1068	2396	3021
	Mattress or mobilization training (MM301)	394	724	1298	1502
	Gait training (MM302)	705	1075	1795	2639
	Total	2197	3624	6781	8688
	Per person	14.36	11.69	18.08	20.06
OT	Simple occupational therapy (MM111)	18	60	142	51
	Complex occupational therapy (MM112)	1138	1299	2139	2582
	Special occupational therapy (MM113)	112	427	756	1462
	Activities of daily living training (MM114)	212	362	832	980
	Total	1480	2148	3869	5075
	Per person	20.85	15.34	20.15	24.28
ST	Rehabilitative dysphagia therapy (MX141)	374	450	766	792
	Per person	22	12.16	12.77	14.67

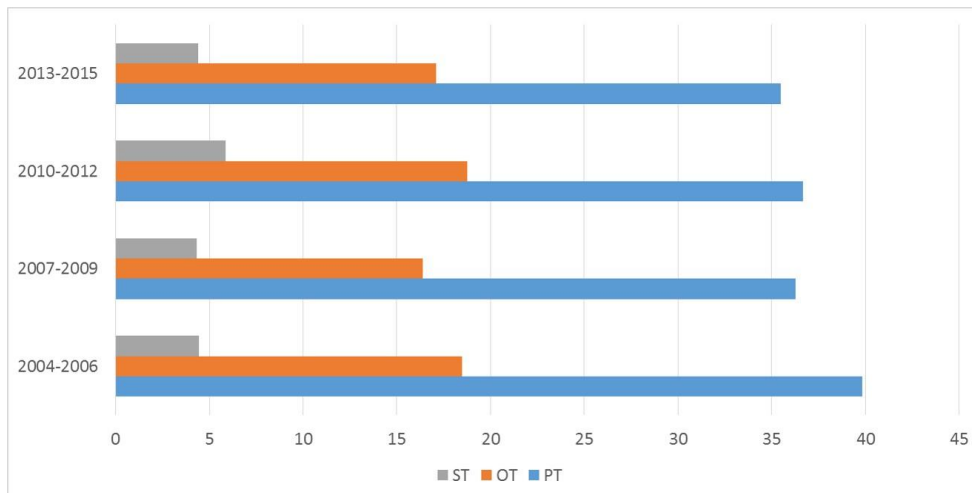


Fig. 1. The percentage of patients who had claims for PT, OT, and ST in each study period.