

Cost analysis of outpatient care for patients with Parkinson's disease

Che-Chun Su^a, Chien-Pang Lee^{b*}

^a Department of Internal Medicine, Changhua Christian Hospital, Changhua, Taiwan

^b Department of Public Finance and Tax Administration, National Taipei University of Business, Taipei City, Taiwan

*Corresponding Author:

Chien-Pang Lee

Department of Public Finance and Tax Administration,

National Taipei University of Business

No. 321, Sec. 1, Jinan Rd., Taipei 10051, Taiwan

Tel: +886-2-2322-6444

E-mail: chienpang@ntub.edu.tw

Abstract

Introduction: Parkinson's disease (PD) affects tens of millions of people globally and is frequently associated with many comorbidities. Its economic burden on the patient, family, and society is heavy.

Objectives: This study aimed to compare the outpatient medical costs of patients with PD to those of controls (non-PD group: people without Parkinson's disease) to understand potential future challenges in caring for PD patients.

Methods: We identified 2,746 PD patients as the PD group and 5,492 persons, matched in age, gender, and significant comorbidities, as the non-PD group from the National Health Insurance (NHI) database in Taiwan. We calculated the costs and explored the differences in outpatient care costs, including medicines of different classes.

Results: The total outpatient payment by NHI in 2013 for PD patients was 77,096 per person. In contrast, it was 40,259 for the non-PD group. For outpatient care in the PD group, the costs of (a) diagnostic fees, (b) medicines, (c) laboratories, images, small operations, and management, (d) unique medical materials, and (e) pharmacist service fees were (a) 12,093, (b) 33,412, (c) 30,254, (d) 1,729, and (e) 1,816, respectively. The non-PD group's costs were (a) 8,981, (b) 19,711, (c) 23,124, (d) 1,345, and (e) 1,181. Neurotic disorders and organic psychotic conditions are present at a much higher frequency in the PD group. Functional GI disorders were more common, too. Finally, the cost of tranquilizers is significantly higher in PD patients.

Conclusion: Patients with Parkinson's Disease incur higher medical expenses compared to control groups. The increased reliance on tranquilizers suggests that PD patients face not only a significant economic burden but also substantial mental strain. Therefore, integrating psychotherapy with medical treatment may be essential for effectively supporting individuals with PD.

Keywords: Parkinson's disease; medical expenditure; cost analysis.

1. Introduction

Parkinson's disease (PD) is a chronic progressive neurodegenerative disorder that affects tens of millions of people worldwide [1, 2]. In addition to the debilitating motor symptoms, including tremors, rigidity, and bradykinesia, PD patients frequently have several comorbidities, from anxiety, depression, and sleep disorders to increased rates of infection, malignancies, and cardiovascular diseases to injuries from accidents or falls resulting from motor disabilities [3].

As a result, PD patients have higher medical needs, which incur higher medical costs. In addition, PD patients can have reduced job performance, decreased workdays, lower earnings, and early retirement or job loss. On the one hand, income may be significantly reduced; on the other hand, expenditure on medical services, health care, or personal care may dramatically increase.

Taiwan started a nationwide health insurance system in March 1995, the National Health Insurance (NHI) system [4, 5]. The NHI covers nearly all services the health system can provide: from parturition to hospice, Western medicine to traditional Chinese medicine, and newborn vaccinations to elderly home care [6]. All citizens in Taiwan are required to join NHI. The coverage rate is more than 98% [7]. At the same time, Taiwan's NHI established Taiwan's National Health Insurance Research Database (NHIRD) to maintain medical records [8]. The NHIRD includes comprehensive medical records, such as patient characteristics, inpatient and outpatient visit records, prescriptions, disease management, and registration locations for almost all residents of Taiwan [7, 9]. Therefore, the NHIRD from NHI provides a valuable opportunity to understand the medical needs and expenditures of PD patients in Taiwan.

Due to the extensive coverage provided by the NHI, numerous payment items are involved. In this analysis, we focused on the costs associated with outpatient services. Costs related to inpatient hospital care and non-acute institutional care will be the subject of a separate study.

This study is organized as follows: Section 2 presents the dataset and outlines the analysis procedure used. Section 3 details the results obtained from the analysis. Sections 4 and 5 discuss these results and provide the study's conclusions.

2. Materials and Methods

2.1 Study dataset

We acquired a database from Taiwan's National Health Insurance Research Database (NHIRD), created by Taiwan National Health Insurance (NHI). The NHIRD contains comprehensive medical records from almost everyone living in Taiwan [7, 9].

In this study, the data were collected from one million people recorded in the NHIRD in 2013. A PD patient is defined by a diagnosis of PD (ICD-9-CM code 332) and prescriptions of Levodopa in at least three office visits in a year. 2,746 PD patients met the requirements. These patients were defined as the PD group in the study. We also studied all the comorbidities in the PD group to select some major ones for the control. A total of 5,492 patients without PD were selected by matching age, sex, and major comorbidities, and they were defined as the control group (the non-PD group). Table 1 shows the distribution of the PD and non-PD groups in sex and age. Table 1 also provides the odds ratio for the seven major comorbidities. These odds ratios range from 0.92 to 1.20, meaning there are no significant differences in the prevalence of these diseases between the PD and non-PD groups. A flowchart of the creation of the PD and non-PD groups is shown in Fig. 1. We then used the PD and non-PD groups as the study dataset in this study.

2.2 Cost analysis procedure

The analysis procedure in this study included four steps. First, we did descriptive statistics of outpatient payment in the PD and non-PD groups, including mean, median, standard deviation, maximum, minimum, and trimmed mean and standard deviation for different payment items. Second, we compared the differences between the PD and non-PD groups in the frequency of diagnosis. Third, we analyzed the cost of outpatient services, including diagnosis, medicines, laboratories, images, operations, and pharmacist services. Finally, we analyzed the cost of various classes of medicines using the odds ratio test. All statistics analyses were implemented with the statistical software *R*, and the statistical significance level α was set to 0.05.

It should be noted that the cost is the outpatient payment in Taiwan's NHI. However, we did not use a unit for the cost in this study because the NHI uses a complicated system to decide the exact payment. Roughly saying, one unit is close to one New Taiwan Dollar. Thus, To avoid

controversy, we do not use the New Taiwan Dollar as the cost unit of outpatient payment in this study. Details can be found in the literature for the evolution of Taiwan's National Health Insurance drug reimbursement scheme [10].

Table 1. The distribution and comparisons of comorbidities between the PD and non-PD groups

	PD group	Non-PD group			
	n	n			
Sex					
Male	1,364	2,728			
Female	1,382	2,764			
Age					
<40	76	152			
40-49	92	184			
50-59	225	450			
60-69	419	838			
≥70	1,394	3,868			
Disease	n	n	Odds ratio	C.I. of odds ratio	p-value
Essential hypertension	926	1,772	1.07	(0.97, 1.18)	0.18
Gingival and periodontal diseases	80	134	1.20	(0.91, 1.59)	0.20
Diabetes mellitus	594	1,119	1.08	(0.95, 1.21)	0.19
Disorders of lipoid metabolism	397	850	0.92	(0.81, 1.05)	0.22
Cataract	143	240	1.20	(0.97, 1.49)	0.09
Hypertensive heart disease	263	497	1.06	(0.91, 1.25)	0.44
Peptic ulcer, site unspecified	147	253	1.17	(0.95, 1.44)	0.20

Note: "n" denotes the number of people in the group; "C.I." is the abbreviation of the confidence interval.

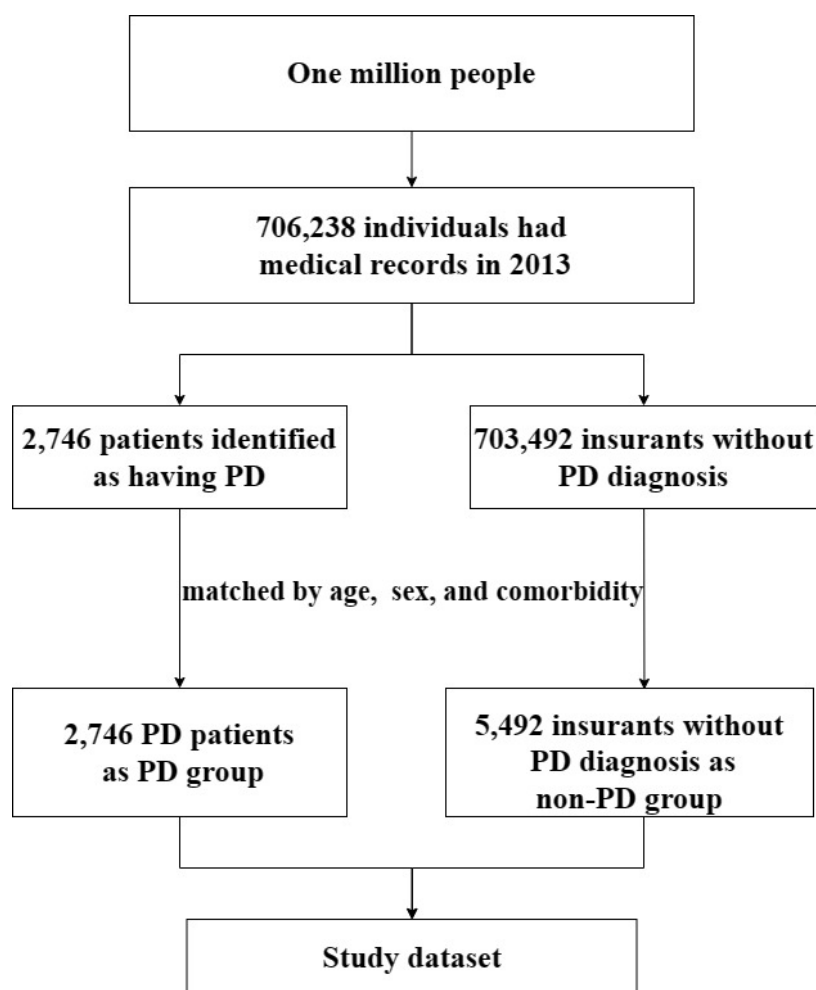


Fig. 1. Flowchart for defining the PD group and the non-PD group

3. Results

3.1 Total Cost

Table 2 shows the total outpatient payments for the PD and non-PD groups. The mean outpatient payments for the PD and non-PD groups were 77,096 and 40,259, respectively, and the median were 52,131 and 18,598, respectively. Obviously, the outpatient payment for the PD group was much higher than that for the non-PD group. Some outliers can distort the conclusion. When we compared the median outpatient payment, the value for the PD group was close to three times that for the non-PD group. We calculated the trimmed mean and standard deviation to delete the impact of extreme outliers. In this study, the trimming proportion was set at 0.05; the highest and lowest 5 percent were deleted. The trimmed mean medical expenditure for the PD group was 2.4 times that of the non-PD group.

Table 2. Total outpatient payment of the PD and non-PD groups

		PD group	Non-PD group
Outpatient payment	Mean	77,096	40,259
	Median	52,131	18,598
	SD	117,536	103,000
	Max	3,094,500	2,717,904
	Min	2,039	0
	Trimmed mean	61,774	25,858
	Trimmed SD	40,318	26,756

Note: (a). “SD” denotes “standard deviation”; (b). The trimming proportion was set at 0.05.

3.2 Outpatient Cost

In Taiwan, outpatient payments include five major classes such as (a) diagnostic fees, (b) medicines, (c) laboratories, images, small operations, and management, (d) special medical materials, and (e) pharmacist service fees. Therefore, we compared outpatient payments across these five classes to identify differences. Table 3 shows the descriptive statistics of outpatient payments in outpatient settings. Obviously, PD patients require more outpatient payments for all items, such as fees for diagnosis, lab, images, operations, other management, medicines, and pharmacist service.

Table 3. Outpatient payment of different types for the PD and non-PD groups

		Class				
		0	1	2	3	9
Average outpatient payment	PD group	12,093	33,412	30,254	1,729	1,816
	non-PD group	8,981	19,711	23,124	1,345	1,181

Note: (a) Class 0 is “Diagnostic fee”; (b) Class 1 is for “Medicines”; (c) Class 2 is for “Laboratories, images, small operations, and management”; (d) Class 3 is for “Special medical materials”; (e) Class 9 is for “Pharmacist service fee.”

3.3 Diagnosis codes in PD and non-PD groups

Since Sections 3.1 and 3.2 indicated that outpatient payments for the PD group were significantly higher than those for the non-PD group, we were interested in understanding the possible reasons for this difference. Therefore, we ranked the diagnosis for the PD and non-PD groups to compare differences in disease prevalence. The top 30 ranks of diagnosis for the PD and non-PD groups are shown in Table 4. For additional information, please refer to the supplemental tables at the end of the article. After comparing these 30 diseases in both groups,

we noted 3 points. First, neurotic disorders and organic psychotic conditions are present in the PD group but absent in the non-PD group. Second, Functional GI disorders were present in 974 out of 2,746 PD patients. In comparison, they were present in 864 out of 5,492 non-PD controls. Third, hypertensive heart disease was present in 405 out of 2,746 PD patients. In contrast, it was present in 684 out of 5,492 non-PD controls. These diseases or conditions are more common in PD patients.

Table 4. The top 30 ranks of diagnosis for the PD and non-PD groups

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Disease	n
1	Parkinson's disease	2,746	Essential hypertension	2,270
2	General symptoms	1,282	Acute upper respiratory infections of multiple or unspecified sites	1,738
3	Essential hypertension	1,268	General symptoms	1,631
4	Functional digestive disorders, not elsewhere classified	974	Gingival and periodontal diseases	1,391
5	Acute upper respiratory infections of multiple or unspecified sites	952	Disorders of conjunctiva	1,363
6	Disorders of conjunctiva	926	Diabetes mellitus	1,353
7	Need for prophylactic vaccination and inoculation against certain viral diseases	871	Disorders of lipid metabolism	1,328
8	Gingival and periodontal diseases	799	General medical examination	1,189
9	Osteoarthritis and allied disorders	783	Need for prophylactic vaccination and inoculation against certain viral diseases	1,069
10	Diabetes mellitus	747	Osteoarthritis and allied disorders	1,062
11	General medical examination	747	Other disorders of soft tissues	1,017
12	Other disorders of soft tissues	644	Diseases of hard tissues of teeth	967
13	Neurotic disorders	614	Acute bronchitis and bronchiolitis	948
14	Disorders of lipid metabolism	608	Symptoms involving respiratory system and other chest symptoms	938

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Disease	n
15	Senile and presenile organic psychotic conditions	603	Other and unspecified disorders of back	935
16	Symptoms involving respiratory system and other chest symptoms	598	Contact dermatitis and other eczema	877
17	Contact dermatitis and other eczema	593	Functional digestive disorders, not elsewhere classified	861
18	Acute bronchitis and bronchiolitis	583	Cataract	807
19	Other and unspecified disorders of back	567	Gastritis and duodenitis	756
20	Spondylosis and allied disorders	519	Peptic ulcer, site unspecified	736
21	Cataract	517	Acute nasopharyngitis	706
22	Other disorders of urethra and urinary tract	509	Symptoms involving head and neck	685
23	Diseases of hard tissues of teeth	506	Hypertensive heart disease	684
24	Hyperplasia of prostate	464	Special screening for malignant neoplasms	648
25	Gastritis and duodenitis	443	Spondylosis and allied disorders	611
26	Disorders of function of stomach	436	Disorders of function of stomach	587
27	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue	424	Other forms of chronic ischemic heart disease	581
28	Symptoms involving head and neck	422	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue	563
29	Hypertensive heart disease	405	Neurotic disorders	545
30	Occlusion of cerebral arteries	393	Other and unspecified disorder of joint	543

Note: "n" denotes the number of patients in the group

3.4 Cost and classes of medicines in outpatient care

Table 5 shows the cost of medicine for PD and non-PD groups with a *p*-value less than 0.05. A total of 15 classes of medicines are listed. There are significant differences in cost for

these 15 classes of medicines between PD and non-PD groups. Meanwhile, we found no cost differences between the other medicine classes. We noted some critical points. First, the cost of tranquilizers is the highest, and the ratio of 2.51 is very significant. PD patients need more medicines for infection, as reflected by higher costs for antibiotics, antifungals, and local anti-infectives. More need for tranquilizers is supported by more need for proton-pump inhibitors, which are for stress-related gastric ulcers. We analyzed the diagnosis codes and found increased functional GI disorders in PD patients. It is supported here by the increased use of Antimuscarinics/Antispasmodics and Anti-flatulents in the cost analysis.

Table 5. The mean outpatient payment of different pharmacology classifications for PD and non-PD groups with statistical significance

Pharmacology Classification	PD group Outpatient payment	non-PD group Outpatient payment	p-value	Odds ratio
Tranquilizers	5,282	2,108	0.028	2.51
Adrenals	203	152	0.018	1.33
Proton-Pump Inhibitor	2,340	1,846	0.013	1.27
Respiratory and Cerebral Stimulants	914	732	0.043	1.25
Miscellaneous Anticonvulsants	3,931	1,935	0.030	2.03
Miscellaneous Antibiotics	724	167	0.023	4.34
Miscellaneous Local Anti-Infectives	298	119	0.003	2.51
Antifungals	205	152	0.035	1.35
Antimuscarinics/Antispasmodics	429	222	0.015	1.93
Antiflatulents	121	79	0.000	1.53
Antibiotics	126	84	0.035	1.50
Local Anesthetics	252	173	0.006	1.45
Genitourinary Smooth Muscle Relaxants Composite	1,751	1,132	0.033	1.55
Unclassified Therapeutic Agents Composite	3,750	2,128	0.001	1.76
Ammonia Detoxicants	1,772	915	0.011	1.94

4. Discussion

To summarize the key findings here: On average, total outpatient payment by NHI in 2013 for a PD patient was 61,774, and for a control, 25,858 after deleting extreme cases. In outpatient settings, the costs of (a) diagnostic fees, (b) medicines, (c) laboratories, images, small operations, and management, (d) special medical materials, and (e) pharmacist service fees were (a) 12,093, (b) 33,412, (c) 30,254, (d) 1,729, and (e) 1,816, respectively. For controls,

their costs were (a) 8,981, (b) 19,711, (c) 23,124, (d) 1,345, and (e) 1,181. Neurotic disorders and organic psychotic conditions are present at a much higher frequency in the PD group. Functional GI disorders were more common, too. Finally, the cost of tranquilizers is the highest on the list, and the ratio is 2.51.

PD is a slowly progressive neurodegenerative disease with its main symptoms of motor dysfunction. The characteristics of PD determine its effects on the patients. First, the uncontrollable body tremors have a significant impact on the patient's social function. The label by others can significantly damage a patient's ego. Work performance can be severely impaired by the stresses induced by poor body control and mental instability. Chronic stresses from subsequences by PD can distort a previously healthy personality. To our no surprise, neurotic disorders, and psychotic conditions are observed at a much higher frequency in PD patients. Functional GI disorders are also common complaints for PD patients.

As a result, PD patients need more support systems to help them overcome these stressful events. The disease burden on the patient, family, and society is paramount. We cannot stop its slowly progressive neurodegenerative course. Its main symptoms of poor body control and performance are so observable that hiding these symptoms from others is impossible. Current therapies can alleviate symptoms, retard the progressive course, but far from cure the disease. To get to the root of all the problems, we fail to identify the cause of PD. The battle is doomed to be very fierce without knowing who and where the enemy is.

The Lewin group made a comprehensive report on the economic burden of PD [11]. The report provides a very comprehensive assessment of the economic burden of PD in the USA in 2017. To summarize the medical cost in the report, PD's average excess medical cost is US\$ 24,439 above not having PD. The average excess cost is US\$ 22,671 for the privately insured, US\$ 19,489 for other groups of persons with PD who are younger than 65 years of age, and US\$ 24,811 for the Medicare beneficiary with PD. Hospital inpatient care, non-acute institutional care (including nursing home, hospice, etc.), and outpatient (including ancillary care) are the three largest cost categories.

5. Conclusion

As mentioned in the introduction, past studies have shown that PD profoundly impacts the patient's physical health, the care of their families, and even the family's finances. In this study, the analysis of medical expenditure shows that the medical expenditure of PD patients was significantly higher than that of non-PD patients. More importantly, medication records showed

that PD patients used more tranquilizers than non-PD patients. This means that along with physical health and financial problems, the mental health of PD patients is altered, and a heavy emotional burden must be borne. Therefore, in the future, it may be necessary to combine psychotherapy with medical treatment for PD patients to be effective in accompanying PD patients.

Acknowledgment

None

Statement of Ethics

The Office of Human Subject Protection approved this study, Changhua Christian Hospital (IRB no. 141008).

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

None

Author Contributions

Che-Chun Su:

1. conception and design of the study
2. acquisition and analysis of data
3. drafting a significant portion of the manuscript or figures

Chien-Pang Lee:

1. conception and design of the study
2. acquisition and analysis of data
3. drafting a significant portion of the manuscript or figures

Data Availability Statement

Data are available from the National Health Insurance Research Database (NHIRD) set up by Taiwan National Health Insurance (NHI). Data cannot be made publicly available because of the “Personal Information Protection Act” of Taiwan. Requests for data can be sent as a formal proposal to the NHIRD (<http://nhird.nhri.org.tw>).

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Supplement Table 1. The top 100 ranks of diagnosis for the PD and non-PD groups

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Diseases	n
1	Parkinson's disease	2,746	Essential hypertension	2,270
2	General symptoms	1,282	Acute upper respiratory infections of multiple or unspecified site	1,738
3	Essential hypertension	1,268	General symptoms	1,631
4	Functional digestive disorders, not elsewhere classified	974	Gingival and periodontal diseases	1,391
5	Acute upper respiratory infections of multiple or unspecified site	952	Disorders of conjunctiva	1,363
6	Disorders of conjunctiva	926	Diabetes mellitus	1,353
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8	Gingival and periodontal diseases	799	General medical examination	1,189
9	Osteoarthritis and allied disorders	783	Need for prophylactic vaccination and inoculation against certain viral diseases	1,069
10	Diabetes mellitus	747	Osteoarthritis and allied disorders	1,062
11	General medical examination	747	Other disorders of soft tissues	1,017
12	Other disorders of soft tissues	644	Diseases of hard tissues of teeth	967
13	Neurotic disorders	614	Acute bronchitis and bronchiolitis	948
14	Disorders of lipid metabolism	608	Symptoms involving respiratory system and other chest symptoms	938
15	Senile and presenile organic psychotic conditions	603	Other and unspecified disorders of back	935
16	Symptoms involving respiratory system and other chest symptoms	598	Contact dermatitis and other eczema	877
17	Contact dermatitis and other eczema	593	Functional digestive disorders, not elsewhere classified	861
18	Acute bronchitis and bronchiolitis	583	Cataract	807
19	Other and unspecified disorders of back	567	Gastritis and duodenitis	756
20	Spondylosis and allied disorders	519	Peptic ulcer, site unspecified	736
21	Cataract	517	Acute nasopharyngitis [common cold]	706
22	Other disorders of urethra and urinary tract	509	Symptoms involving head and neck	685
23	Diseases of hard tissues of teeth	506	Hypertensive heart disease	684
24	Hyperplasia of prostate	464	Special screening for malignant neoplasms	648
25	Gastritis and duodenitis	443	Spondylosis and allied disorders	611

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Diseases	n
26	Disorders of function of stomach	436	Disorders of function of stomach	587
27	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue	424	Other forms of chronic ischemic heart disease	581
28	Symptoms involving head and neck	422	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue	563
29	Hypertensive heart disease	405	Neurotic disorders	545
30	Occlusion of cerebral arteries	393	Other and unspecified disorder of joint	543
31	Symptoms involving urinary system	386	Acute sinusitis	536
32	Other forms of chronic ischemic heart disease	370	Other noninfectious gastroenteritis and colitis	511
33	Acute nasopharyngitis [common cold]	367	Other symptoms involving abdomen and pelvis	475
34	Special screening for malignant neoplasms	360	Allergic rhinitis	470
35	Peptic ulcer, site unspecified	344	Diseases of esophagus	463
36	Other extrapyramidal disease and abnormal movement disorders	331	Hyperplasia of prostate	462
37	Vertiginous syndromes and other disorders of vestibular system	326	Other disorders of urethra and urinary tract	458
38	Symptoms involving digestive system	325	Acute tonsillitis	454
39	Other and unspecified disorder of joint	321	Diseases of pulp and periapical tissues	450
40	Other symptoms involving abdomen and pelvis	312	Symptoms involving digestive system	419
41	Dermatophytosis	294	Acute laryngitis and tracheitis	413
42	Chronic bronchitis	289	Pruritus and related conditions	398
43	Late effects of cerebrovascular disease	282	Dermatophytosis	384
44	Diseases of esophagus	279	Acute pharyngitis	378
45	Other noninfectious gastroenteritis and colitis	279	Chronic liver disease and cirrhosis	378
46	Allergic rhinitis	265	Disorders of lacrimal system	372
47	Other disorders of bone and cartilage	261	Other disorders of synovium, tendon and bursa	371
48	Diseases of pulp and periapical tissues	247	Gout	370
49	Special symptoms or syndromes not elsewhere classified	245	Cardiac dysrhythmias	357
50	Pneumonia, organism unspecified	245	Peripheral enthesopathies and allied syndromes	343
51	Pruritus and related conditions	245	Disorders of external ear	342
52	Disorders of lacrimal system	244	Vertiginous syndromes and other disorders of vestibular system	333

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Diseases	n
53	Cardiac dysrhythmias	244	Symptoms involving urinary system	329
54	Symptoms involving skin and other integumentary tissue	232	Chronic bronchitis	319
55	Acute sinusitis	228	Other retinal disorders	282
56	Other and ill-defined cerebrovascular disease	226	Symptoms involving skin and other integumentary tissue	280
57	Disorders of external ear	211	Urticaria	279
58	Schizophrenic disorders	202	Other and unspecified arthropathies	269
59	Acute laryngitis and tracheitis	198	Other disorders of bone and cartilage	269
60	Other retinal disorders	197	Asthma	268
61	Heart failure	195	Organ or tissue replaced by other means	266
62	Acute pharyngitis	195	Other local infections of skin and subcutaneous tissue	255
63	Acute tonsillitis	191	Special symptoms or syndromes not elsewhere classified	250
64	Peripheral enthesopathies and allied syndromes	190	Other diseases and conditions of the teeth and supporting structures	250
65	Other cellulitis and abscess	188	Visual disturbances	248
66	Other organic psychotic conditions (chronic)	186	Other and ill-defined sprains and strains	246
67	Chronic renal failure	184	Chronic renal failure	240
68	Other disorders of synovium, tendon and bursa	182	Other cellulitis and abscess	240
69	Other diseases and conditions of the teeth and supporting structures	181	Other disorders of eyelids	237
70	Affective psychoses	180	Contusion of lower limb and of other and unspecified sites	236
71	Chronic liver disease and cirrhosis	180	Disorders of muscle, ligament and fascia	233
72	Other and unspecified arthropathies	180	Intervertebral disc disorders	231
73	Gastric ulcer	177	Other diseases of upper respiratory tract	225
74	Organ or tissue replaced by other means	177	Symptoms involving cardiovascular system	221
75	Chronic airways obstruction, not elsewhere classified	176	Sprains and strains of other and unspecified parts of back	221
76	Other local infections of skin and subcutaneous tissue	174	Chronic pharyngitis and nasopharyngitis	217
77	Contusion of lower limb and of other and unspecified sites	173	Occlusion of cerebral arteries	209

PD group (total 2,746)			Non-PD group (total 5,492)	
Rank	Disease	n	Diseases	n
78	Symptoms involving cardiovascular system	169	Inflammation of eyelids	206
79	Gout	168	Gastric ulcer	206
80	Asthma	162	Keratitis	203
81	Contusion of trunk	162	Heart failure	203
82	Disorders of muscle, ligament and fascia	159	Contusion of trunk	203
83	Other disorders of eyelids	154	Senile and presenile organic psychotic conditions	197
84	Intervertebral disc disorders	148	Angina pectoris	194
85	Visual disturbances	143	Special investigations and examinations	187
86	Keratitis	139	Other disorders of ear	186
87	Disorders of fluid, electrolyte and acid-base balance	137	Chronic airways obstruction, not elsewhere classified	183
88	Hemorrhoids	137	Hemorrhoids	182
89	Other open wound of head	137	Glaucoma	175
90	Chronic pharyngitis and nasopharyngitis	136	Ill-defined intestinal infections	165
91	Glaucoma	135	Disorders of refraction and accommodation	154
92	Fracture of vertebral column without mention of spinal cord injury	131	Contusion of upper limb	153
93	Other and unspecified anemias	128	Late effects of cerebrovascular disease	152
94	Other diseases of upper respiratory tract	128	Bronchitis, not specified as acute or chronic	152
95	Other cerebral degenerations	126	Viral hepatitis	148
96	Chronic ulcer of skin	125	Other and unspecified anemias	148
97	Urticaria	124	Pneumonia, organism unspecified	148
98	Cystitis	123	Inflammatory disease of cervix, vagina and vulva	146
99	Sprains and strains of other and unspecified parts of back	122	Other disorders of cervical region	146
100	Angina pectoris	120	Foreign body on external eye	146

Supplement Table 2. The mean outpatient payment of different pharmacology classifications for PD and non-PD groups with statistical test

Pharmacology Classification	PD group outpatient payment	Non-PD group outpatient payment	<i>p</i> -Value	Odds ratio
Vitamin k activity	20	69	0.918	0.30
Vitamin d	1,059	803	0.311	1.32
Vitamin b complex composite	223	201	0.341	1.11
Vitamin b complex	402	339	0.062	1.19
Vasodilating agents	603	658	0.767	0.92
Vasoconstrictors composite	51	90	0.858	0.56
Urinary anti-infectives	89	76	0.321	1.18
Uricosuric Agents	378	428	0.812	0.88
Unclassified Therapeutic Agents Composite	3,750	2,128	0.001	1.76
Unclassified Therapeutic Agents	3,357	2,676	0.144	1.25
Tranquilizers	5,282	2,108	0.028	2.51
Toxoids	34	33	0.417	1.03
Thyroid Agents	278	299	0.646	0.93
Tetracyclines	74	71	0.463	1.03
Sympathomimetic or Adrenergic Agents	331	516	0.866	0.64
Sympathomimetic or Adrenergic Agents	323	206	0.003	1.57
Sympatholytic or Adrenergic Blocking Agents	1,308	1,187	0.278	1.10
Sympathmimetic or Adrenergic Blocking Agents Compo	356	190	0.119	1.88
Sulfonylureas	775	966	0.952	0.80
Sulfonamides	54	73	0.904	0.75
Smooth Muscle Relaxants	452	364	0.333	1.24
Skeletal Muscle Relaxants Composite	428	533	0.784	0.80
Skeletal Muscle Relaxants	331	245	0.080	1.35
Serotonin Antagonists	94	79	0.405	1.19
Scabicides and Pediculicides	445	295	0.151	1.51
Respiratory Smooth Muscle Relaxants Composite	70	68	0.480	1.02
Respiratory Smooth Muscle Relaxants	270	262	0.392	1.03
Respiratory and Cerebral Stimulants	914	732	0.043	1.25
Replacement Preparations Composite	371	389	0.571	0.95
Replacement Preparations	78	71	0.117	1.09
Quinolones	1,294	1,016	0.102	1.27
Psychotherapeutic Agents	6,575	5,573	0.268	1.18
Proton-Pump Inhibitor	2,340	1,846	0.013	1.27
Progestins	732	985	0.637	0.74
Potassium-Sparing Diuretics	230	329	0.924	0.70
Potassium-Removing Resins	1,923	934	0.161	2.06

Pharmacology Classification	PD group outpatient payment	Non-PD group outpatient payment	<i>p</i> -Value	Odds ratio
Pituitary	7,108	5,004	0.188	1.42
Penicillins	325	146	0.058	2.22
Parathyroid	16,452	76,802	0.889	0.21
Parasympathomimetic or Cholinergic Agents	2,465	3,725	0.930	0.66
Opiate Partial Agonists	49	46	0.323	1.06
Opiate Agonists	98	393	0.964	0.25
Nonsteroidal Anti-Inflammatory Agents	499	450	0.063	1.11
Mucolytic Agents Composite	406	50	0.084	8.10
Mucolytic Agents	578	344	0.000	1.68
Mouthwashes and Gargles	279	159	0.062	1.76
Miscellaneous -Lactam Antibiotics	3,599	11,981	0.824	0.30
Miscellaneous Therapeutic Agent Composite	16,819	13,862	0.361	1.21
Miscellaneous Skin and Mucous Membrane Composite	472	992	0.803	0.48
Miscellaneous Skin and Mucous Membrane Agents	237	150	0.098	1.58
Miscellaneous Psychotherapeutic Agents	15,751	18,097	0.655	0.87
Miscellaneous Local Anti- Infectives	298	119	0.003	2.51
Miscellaneous Gi Drugs Composite	283	320	0.662	0.88
Miscellaneous Gi Drugs	276	325	0.778	0.85
Miscellaneous Eent Drugs Composite	387	524	0.915	0.74
Miscellaneous Eent Drugs	425	483	0.778	0.88
Miscellaneous Anxiolytics,Sedatives And Hypnotics	475	286	0.000	1.66
Miscellaneous Anti-Infectives Composite	74	57	0.067	1.30
Miscellaneous Anti-Infectives	300	300	0.498	1.00
Miscellaneous Antidiabetic Agents	1,267	1,212	0.318	1.05
Miscellaneous Anticonvulsants	3,931	1,935	0.030	2.03
Miscellaneous Analgesics And Antipyretics	68	43	0.000	1.56
Miscellaneous Antibiotics	724	167	0.023	4.34
Misceallaneous Therapeutic Agent	6,070	3,401	0.000	1.78
Miotics	558	564	0.514	0.99
Local Anesthetics	252	173	0.006	1.45
Keratolytic Agents Composite	132	149	0.642	0.89
Keratolytic Agents	173	129	0.139	1.34
Iron Preparations	556	633	0.728	0.88
Insulins	3,193	3,157	0.479	1.01
Immunobiologic Agents	74,240	172,901	0.871	0.43
Hypotensive Agents Composite	3,496	3,800	0.746	0.92

Pharmacology Classification	PD group outpatient payment	Non-PD group outpatient payment	<i>p</i> -Value	Odds ratio
Hypotensive Agents	2,425	2,626	0.959	0.92
Hydantoins	751	576	0.188	1.30
Hemostatics	63	49	0.090	1.28
Hemorrhologic Agents	461	463	0.509	1.00
Hematopoietic Agents	23,234	9,074	0.128	2.56
H2-Blocker	353	229	0.000	1.54
Genitourinary Smooth Muscle Relaxants	1,751	1,132	0.033	1.55
Gastrointestinal Smooth Muscle Relaxants	872	568	0.132	1.54
Expectorants Composite	261	122	0.214	2.14
Expectorants	264	132	0.000	2.00
Estrogens	825	2,580	0.941	0.32
Erythromycins	229	225	0.469	1.02
Enzymes Composite	342	172	0.080	1.99
Enzymes	1,473	450	0.195	3.27
Entrogens Composite	245	217	0.418	1.13
Emollients, Demulcents, And Protectants Composite	203	114	0.080	1.79
Diuretics Composite	209	427	0.969	0.49
Diuretics	203	259	0.996	0.78
Dipeptidyl Peptidase 4(Dpp- 4)Inhibitors	5,101	5,382	0.708	0.95
Digestants Composite	309	232	0.095	1.33
Digestants	1,142	1,343	0.628	0.85
Cytoprotective Agents	452	503	0.590	0.90
Common Cold Prerations	67	53	0.300	1.27
Common Cold Preparations	68	59	0.275	1.15
Cholelitholytic Agents	863	672	0.277	1.28
Chloramphenicol	23	24	0.584	0.95
Cephalosporins	191	163	0.141	1.17
Central Nervous System Agents	1,707	1,545	0.252	1.10
Cathartics And Laxatives Composite	567	660	0.678	0.86
Cathartics And Laxatives	276	181	0.000	1.52
Cardiac Drugs	1,207	1,573	1.000	0.77
Cardiac Drugs Composite	3,872	4,079	0.599	0.95
Carbonic Anhydrase Inhibitors	97	161	0.799	0.60
Caloric Compound Agents Composite	41	377	0.894	0.11
Caloric Agents	29	216	0.928	0.13
Bone Resorption Inhibitors	14,115	15,860	0.715	0.89
Blood Derivatives	17,802	20,116	0.596	0.88
Benzodiazepines	478	333	0.000	1.44
Basic Ointments And Protectants	110	134	0.732	0.82
Barbiturates	301	232	0.200	1.30
Antivirals	3,143	13,368	1.000	0.24
Antitussives Composite	147	126	0.109	1.17

Pharmacology Classification	PD group outpatient payment	Non-PD group outpatient payment	<i>p</i> -Value	Odds ratio
Antitussives	166	120	0.071	1.39
Antituberculosis Agents Composite	2,456	1,714	0.164	1.43
Antituberculosis Agents	636	1,318	0.784	0.48
Antithyroid Agents	236	284	0.758	0.83
Antipruritics And Local Anesthetics Composite	183	114	0.085	1.61
Antipruritics And Local Anesthetics	343	302	0.416	1.14
Antiparkinsonian Agents	3,127	530	0.000	5.91
Antineoplastic Agents	37,248	52,953	0.782	0.70
Antimuscarinics/Antispasmodics	429	222	0.015	1.93
Antimalarial Agents	948	615	0.064	1.54
Antilipemic Agents Composite	5,018	5,878	0.812	0.85
Antilipemic Agents	2,867	2,729	0.270	1.05
Anti-Inflammatory Agents Composite	167	115	0.057	1.45
Anti-Inflammatory Agents	602	685	0.736	0.88
Anti-Inflammatory Agents Composite	90	84	0.387	1.07
Antihistamine Drugs Composite	56	36	0.160	1.55
Antihistamine Drugs	133	125	0.304	1.06
Antifungals	205	152	0.035	1.35
Antifungal Antibiotics	685	515	0.186	1.33
Antiflatulents	121	79	0.000	1.53
Antiemetics Composite	132	110	0.399	1.20
Antiemetics	424	250	0.000	1.70
Antidiarrhea Agents Composite	48	40	0.243	1.23
Antidiarrhea Agents	229	126	0.187	1.82
Antidiabetic Agents	3,187	3,879	0.958	0.82
Antidepressants	1,688	1,629	0.394	1.04
Anticoagulants	3,683	3,148	0.414	1.17
Anticholinergic Agents	4,030	5,293	0.884	0.76
Antibiotics Composite	588	410	0.159	1.43
Antibiotics	126	84	0.035	1.50
Antacids And Adsorbents Composite	223	215	0.416	1.03
Antacids And Adsorbents	166	164	0.472	1.01
Androgens	20,105	30,002	0.698	0.67
Ammonia Detoxicants	1,772	915	0.011	1.94
Aminoglycosides	42	59	0.845	0.71
Alkalinizing Agents	161	377	0.940	0.43
Adrenals Composite	56	130	0.953	0.43
Adrenals	203	152	0.018	1.33