Table 1. Comparison of cortical volume between the PD and HC groups.

	Parkinson's disease (n = 12)		Healthy controls (n = 12)		p-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Caudal anterior cingulate	2763.08	2030.5	3079.08	2206.33	NS	NS
Caudal middle frontal	5547.83	5119.5	6497.33	5927.42	NS	NS
Cuneus	3808.42	3386.67	3621.83	3159	NS	NS
Entorhinal	1279.75	1167.92	1381.17	1256.75	NS	NS
Fusiform	5529.17	5820.75	6817.08	6114.92	*0.034	NS
Inferior parietal	10132.25	11011	11417.58	13497.42	NS	*0.023
Inferior temporal	6261.42	6966.42	6998.5	6833.83	NS	NS
Isthmus cingulate	2281.17	1855.5	1973.25	2228.91	NS	NS
Lateral occipital	10277.42	10967.5	11362	11602.08	NS	NS
Lateral orbitofrontal	6999.17	6636	7132.42	6850.08	NS	NS
Lingual	5280.83	5429.5	5162	6339.08	NS	NS
Medial orbitofrontal	3591.58	3325.67	3788	3605.58	NS	*0.049
Middle temporal	8409.83	9441.75	9499.67	10080.58	NS	NS
Parahippocampal	1700.75	1794.08	2018.67	1978.33	NS	NS
Paracentral	4496.25	4230.83	4102.33	4397.83	NS	NS
Pars opercularis	3680.17	3583.92	3775.92	3693.67	NS	NS
Pars orbitalis	1719.33	1625.58	1761.67	1683.75	NS	NS

Pars triangularis	3936.08	3454.17	3984.17	3298.58	NS	NS
Pericalcarine	2008.17	2377.67	1774.42	2083.08	NS	NS
Postcentral	10938.5	9531.75	10725.08	10301.33	NS	NS
Posterior cingulate	2926.58	3090	3116.17	3360.83	NS	NS
Precentral	12170.08	11540.58	12986	11994	NS	NS
Precuneus	8327.42	7776.08	7216.67	8043.92	NS	NS
Rostral anterior cingulate	2744.25	1707.25	2927	1985.08	NS	*0.046
Rostral middle frontal	8694.33	8892.33	10198.83	9685.67	*0.047	NS
Superior frontal	19067.33	22063.58	21613.92	23243.42	*0.028	NS
Superior parietal	10314.25	9991.67	9468	9672.5	NS	NS
Superior temporal	12573.17	11697.5	13640.42	12589.33	NS	NS
Supramarginal	9377.17	7873.25	9677	8931.5	NS	NS
Transverse temporal	1073.92	761.25	1090.08	868.17	NS	NS
Insula	5382.67	5347.75	5345.5	5497	NS	NS

Abbreviations: NS, Not significant

The PD and HC groups were compared using the independent t test, and nonparametric data analysis was performed using the Mann-Whitney U test. The thresholds of significance were as follows: *p < 0.05, *p < 0.01, and **p < 0.001.

Table 2. Comparison of cortical thickness between the PD and the HC groups.

	Parkinson's disease (n=12)		Healthy controls (n=12)		p-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Caudal anterior cingulate	2.41225	2.42033	2.489	2.3065	NS	NS
Caudal middle frontal	2.25375	2.22458	2.35708	2.29408	NS	NS
Cuneus	1.876	1.84983	1.89125	1.83433	NS	NS
Entorhinal	2.64417	2.56158	2.6475	2.62358	NS	NS
Fusiform	2.11025	2.22325	2.24717	2.24958	*0.049	NS
Inferior parietal	2.11617	2.19283	2.21408	2.2385	NS	NS
Inferior temporal	2.15967	2.17108	2.13958	2.16567	NS	NS
Isthmus cingulate	1.97133	1.82258	1.95717	1.95675	NS	NS
Lateral occipital	1.95692	2.03	2.01483	2.08542	NS	NS
Lateral orbitofrontal	2.34858	2.16675	2.37408	2.26917	NS	NS
Lingual	1.85267	1.89542	1.88283	1.903	NS	NS
Medial orbitofrontal	2.03917	2.06758	2.079	2.15475	NS	NS
Middle temporal	2.16283	2.23542	2.27433	2.27275	NS	NS
Parahippocampal	2.24175	2.11825	2.24608	2.29317	NS	*0.018
Paracentral	2.09992	2.08367	2.16075	2.23533	NS	NS
Pars opercularis	2.30608	2.25817	2.36533	2.268	NS	NS
Pars orbitalis	2.34975	2.14925	2.44892	2.24633	NS	NS

Pars triangularis	2.21083	2.13308	2.29275	2.15417	NS	NS
Pericalcarine	1.6865	1.74333	1.64583	1.64808	NS	NS
Postcentral	2.00367	1.96125	2.00208	1.987	NS	NS
Posterior cingulate	2.1045	2.11317	2.1145	2.07325	NS	NS
Precentral	2.31825	2.25592	2.37192	2.3235	NS	NS
Precuneus	2.04383	1.95467	2.01667	2.02258	NS	NS
Rostral anterior cingulate	2.28108	2.32242	2.33283	2.39542	NS	NS
Rostral middle frontal	2.08958	2.04333	2.16892	2.07642	NS	NS
Superior frontal	2.301	2.29917	2.3735	2.59967	NS	NS
Superior parietal	1.98675	2.06092	2.06642	2.08467	NS	NS
Superior temporal	2.26175	2.30083	2.34625	2.31967	NS	NS
Supramarginal	2.20025	2.18292	2.29875	2.27267	NS	NS
Transverse temporal	2.00475	2.12117	2.10883	2.074	NS	NS
Insula	2.58417	2.52583	2.65925	2.64642	NS	NS

Abbreviations: NS, Not significant
The PD and HC groups were compared using the independent t test, and nonparametric data analysis was performed using the Mann-Whitney U test. The thresholds of significance were as follows: *p < 0.05, *p < 0.01, and **p < 0.001.

Table 3. Comparison of subcortical volume between the PD and HC groups.

	Parkinson's disease (n=12)		Healthy controls (n=12)		p-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Lateral-ventricle	14663.88	10874.9	10139.43	8486.66	NS	NS
Cerebellum-white-matter	7082.28	5829.66	9892.57	8338.94	NS	*0.045
Cerebellum-cortex	21729.63	22506.33	27758.12	29117.14	*0.013	**0.004
Thalamus	8125.39	7364.69	8109.31	7438.46	NS	NS
Caudate	2957.04	2935.87	2932.26	3071.36	NS	NS
Putamen	4620.29	4403.55	4575.17	4659.67	NS	NS
Pallidum	2085.34	1995.18	2089.57	2090.74	NS	NS
Hippocampus	3210.77	2549.78	3327.99	3513.46	NS	**0.005
Amygdala	1152.23	1076.71	1274.57	1462.43	NS	*0.021
Accumbens area	309.88	331.81	360.14	391.01	NS	NS
Corpus callosum anterior	1192.95		964.68		NS	
Corpus callosum central	937.33		992.51		NS	
Corpus callosum posterior	1107.71		1173.53		NS	

Abbreviations: NS, Not significant
*The PD and HC groups were compared using the independent t test, and nonparametric data analysis was performed using the Mann-Whitney U test. The thresholds of significance were as follows: *p < 0.05, *p < 0.01, and **p < 0.001.*

Table 4. Comparison of cortical volume between the PD patients with and without axial symptoms.

	PD with Axial Sx. (n = 5)		PD without Axial Sx. (n = 7)		*p*-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Caudal anterior cingulate	2701.6	1950.6	2807	2087.6	NS	NS
Caudal middle frontal	6151.4	5476	5116.7	4864.9	NS	NS
Cuneus	4243.6	3500.2	3497.6	3305.6	NS	NS
Entorhinal	1227.6	1036.8	1317	1261.6	NS	NS
Fusiform	5414.4	5494.6	5611.1	6053.7	NS	NS
Inferior parietal	10356.8	11411	9971.9	10725.3	NS	NS
Inferior temporal	6048.6	6257.2	6413.4	7473	NS	NS
Isthmus cingulate	2336.6	2020	2241.6	1738	NS	NS
Lateral occipital	10306	10469	10257	11323.6	NS	NS
Lateral orbitofrontal	6803	6581	7139.3	6675.4	NS	NS
Lingual	5305.6	5429.6	5263.1	5429.4	NS	NS
Medial orbitofrontal	3660.8	3225.2	3542.1	3397.4	NS	NS
Middle temporal	8857.4	8897.8	8090.1	9830.3	NS	NS
Parahippocampal	1756.8	1859	1660.7	1747.7	NS	NS
Paracentral	3951.6	3740	4885.2	4581.4	NS	*0.030
Pars opercularis	3767.2	3850.8	3618	3393.3	NS	NS
Pars orbitalis	1644	1634.4	1773.1	1619.3	NS	NS

Pars triangularis	3719.6	3243.2	4090.7	3604.9	NS	NS
Pericalcarine	2347.2	2402.8	1766	2359.7	NS	NS
Postcentral	10486.8	9675.8	11261.1	9428.9	NS	NS
Posterior cingulate	2670.2	2861.8	3109.7	3253	NS	NS
Precentral	12505	11460	11930.9	11598.1	NS	NS
Precuneus	8036.2	7604.8	8535.4	7898.4	NS	NS
Rostral anterior cingulate	2853.4	1743.8	2666.3	1681.1	NS	NS
Rostral middle frontal	9130.4	8638.8	8382.9	9073.4	NS	NS
Superior frontal	19569.2	22562.4	18708.9	21707.3	NS	NS
Superior parietal	10898.8	10650.2	9896.7	9521.3	NS	NS
Superior temporal	12113.4	11944.4	12901.6	11521.1	NS	NS
Supramarginal	8520.4	8273.8	9989.1	7587.1	NS	NS
Transverse temporal	1125.2	827.6	1037.3	713.9	NS	NS
Insula	5321	5519.8	5426.7	5224.9	NS	NS

Abbreviations: NS, Not significant
The PD patients with and without axial symptoms were compared using the Mann-Whitney U test. The thresholds of significance were as follows: *p < 0.05, *p < 0.01, and **p < 0.001.

Table 5. Comparison of cortical thickness between the PD patients with and without axial symptoms

	PD with Axial Sx. (n = 5)		PD without Axial Sx. (n = 7)		*p*-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Caudal anterior cingulate	2.4148	2.3994	2.4104	2.4353	NS	NS
Caudal middle frontal	2.3324	2.2652	2.1976	2.1956	NS	NS
Cuneus	1.8484	1.8036	1.8957	1.8829	NS	NS
Entorhinal	2.6534	2.6836	2.6376	2.4744	NS	NS
Fusiform	2.0728	2.2038	2.137	2.2371	NS	NS
Inferior parietal	2.1314	2.2344	2.1053	2.1631	NS	NS
Inferior temporal	2.151	2.1796	2.1659	2.165	NS	NS
Isthmus cingulate	1.9642	1.8868	1.9764	1.7767	NS	NS
Lateral occipital	1.9504	2.0838	1.9616	1.9916	NS	NS
Lateral orbitofrontal	2.3182	2.2588	2.3703	2.101	NS	NS
Lingual	1.8244	1.8958	1.8729	1.8951	NS	NS
Medial orbitofrontal	2.0402	2.147	2.0384	2.0109	NS	NS
Middle temporal	2.1914	2.2384	2.1424	2.2333	NS	NS
Parahippocampal	2.191	2.1316	2.278	2.1087	NS	NS
Paracentral	1.994	2.031	2.1756	2.1213	NS	NS
Pars opercularis	2.3166	2.2754	2.2986	2.2459	NS	NS
Pars orbitalis	2.295	2.1472	2.3889	2.1507	NS	NS

Pars triangularis	2.186	2.165	2.22	2.1103	NS	NS
Pericalcarine	1.7008	1.6834	1.6763	1.7861	NS	NS
Postcentral	1.9654	1.9142	2.031	1.9949	NS	NS
Posterior cingulate	2.041	2.0446	2.1499	2.1621	NS	NS
Precentral	2.3048	2.2532	2.3279	2.2579	NS	NS
Precuneus	2.0654	1.9678	2.0284	1.9453	NS	NS
Rostral anterior cingulate	2.3572	2.282	2.2267	2.3513	NS	NS
Rostral middle frontal	2.1236	2.0356	2.0653	2.0489	NS	NS
Superior frontal	2.2584	2.2842	2.3314	2.3099	NS	NS
Superior parietal	2.0474	2.063	1.9434	2.0594	NS	NS
Superior temporal	2.224	2.3204	2.2887	2.2869	NS	NS
Supramarginal	2.2808	2.2026	2.1427	2.1689	NS	NS
Transverse temporal	1.98	2.1552	2.0224	2.0969	NS	NS
Insula	2.5604	2.4748	2.6011	2.5623	NS	NS

Abbreviations: NS, Not significant

The PD patients with and without axial symptoms were compared using the Mann-Whitney U test. The thresholds of significance were as follows: *p < 0.05, *p < 0.01, and **p < 0.001.

Table 6. Comparison of subcortical volume between the PD patients with and without axial symptoms.

	PD with Axial Sx. (n = 5)		PD without Axial Sx. (n = 7)		*p*-value	
	Left hemi	Right hemi	Left hemi	Right hemi	Left hemi	Right hemi
Lateral-ventricle	16227.08	10512.86	13547.31	11133.5	NS	NS
Cerebellum-white-matter	7099.9	6007.4	7069.69	5702.7	NS	NS
Cerebellum-cortex	20497	20053.14	22610.07	24258.61	NS	NS
Thalamus	8236.72	7233.4	8045.87	7458.47	NS	NS
Caudate	2727.22	2907.32	3121.2	2956.26	NS	NS
Putamen	4483.28	4372.58	4718.16	4425.67	NS	NS
Pallidum	2035.74	1949.58	2120.77	2027.76	NS	NS
Hippocampus	3140.7	2489.36	3260.81	2592.94	NS	NS
Amygdala	1135.14	1130.04	1164.43	1038.61	NS	NS
Accumbens area	336.6	351.38	290.8	317.83	NS	NS
Corpus callosum anterior	1309.42		1109.76		NS	
Corpus callosum central	787.22		1044.54		*0.030	
Corpus callosum posterior	1080.48		1127.16		NS	

Abbreviations: NS, Not significant
The PD patients with and without axial symptoms were compared using the Mann-Whitney U test. The thresholds of significance were as follows:
*p < 0.05, *p < 0.01, and **p < 0.001.