

# Type and Intensity of Daily Energy Expenditure Among Parkinson's Disease Patients Based Upon Body Weight

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## Objective

To determine the relationship between body mass index (BMI) and activity in patients with Parkinson's disease (PD).

## Background

Parkinson's Disease (PD) can have significant effects on physical and cognitive functioning, but movement disorder specialists know little about the physical and cognitive activities that PD patients routinely engage in and specifically, if activities are affected by body mass index (BMI).

## Methods

98 PD patients answered a mailed survey, including an investigator-generated PD activity questionnaire (measuring frequency, type, and intensity of daily activities), the Beck Depression Inventory-II (BDI-II), the Parkinson's Disease Questionnaire-8 (a quality of life -QOL- instrument), and a demographic measure. We categorized patients into 2 weight groups (underweight/normal and overweight/obese) and activities into 5 domains and 3 intensity levels. Data were analyzed with nonparametric statistics and Pearson product-moment correlation coefficient using SPSS-12.

**Table 1 Description of the Study Population**

### Results

	All patients		BMI Group				p-value
	Mean	SD	Underweight / normal weight		Overweight / obese		
			Mean	SD	Mean	SD	
Age	72.8	9.0	74.8	8.8	71.4	9.0	.0675
	n	%	n	%	n	%	
Gender (n=98)							.5083
Men	96	98.0	41	100.0	55	96.5	
Women	2	2.0	0	0.0	2	3.5	
Marital status (n=98)							1.00
Not married	27	27.6	11	26.8	16	28.1	
Married	71	72.5	30	73.2	41	71.9	
Education (n=97)							.4420
Less than high school /High school grad	35	36.1	15	36.6	20	35.7	
Some college	23	23.7	8	19.5	15	26.8	
College degree	24	24.7	9	22.0	15	26.8	
Graduate degree	15	15.5	9	22.0	6	10.7	
Income (n=94)							.5108
Less than adequate	32	34.0	12	29.3	20	37.7	
Adequate/more than adequate	62	66.0	29	70.7	33	62.3	
Health status (n=97)							.7285
Poor	6	6.2	3	7.3	3	5.4	
Fair	44	45.4	20	48.8	24	42.9	
Good/excellent	47	48.5	18	43.9	29	51.8	
Pain (n=96)							.3825
Yes	64	66.7	25	61.0	39	70.9	
No	32	33.3	16	39.0	16	29.1	
Memory problem (n=95)							.1665
Yes	69	72.6	33	80.5	36	66.7	
No	26	27.4	8	19.5	18	33.3	
Falls (n=97)							.0386*
None	47	48.5	18	43.9	29	51.8	
1-4	40	41.2	15	36.6	25	44.6	
5 or more	10	10.3	8	19.5	2	3.6	
Medications for depression (n=96)							.0564
Yes	34	35.4	10	24.4	24	43.6	
No	62	64.6	31	75.6	31	56.4	
Quality of life (n=96)							.1726
Not good	15	16.0	8	19.5	7	13.2	
Sometimes good	21	22.3	12	29.3	9	17.0	
Usually good	51	54.3	20	48.8	31	58.5	
Could not be better	7	7.5	1	2.4	6	11.3	
Help with walking (n=98)							.4901
Yes	25	25.5	12	29.3	13	22.8	
No	73	74.5	29	70.7	44	77.2	

\*\* Correlation is significant at the 0.01 level (2-tailed)

**Table 2 Energy Expenditure by BMI Group**

### Results

Energy expenditure	BMI Group				Total n=98		p-value for t-test
	Underweight/normal weight n = 41		Overweight/ obese n=57		Mean	SD	
	Mean	SD	Mean	SD			
Daily energy expenditure	22.9	12.9	23.8	15.4	23.4	14.3	.7626
Daily energy Kcal	1,665.1	977.9	2,166.8	1,415.0	1,956.9	1,269.7	.0406 *
Daily Kcal physical	809.8	764.7	1,007.2	1,139.7	924.6	1,000.3	.3078
Daily Kcal social	171.3	203.0	296.3	385.8	244.0	327.5	.0413 *
Daily Kcal intellectual	257.2	287.8	317.5	286.9	292.2	287.3	.3080
Daily Kcal ADL	239.6	170.9	330.5	341.9	292.4	285.6	.0873
Daily Kcal TV	187.3	173.3	215.2	176.5	203.6	174.8	.4388
Total Kcal light intensity	7,461.0	4,385.8	9,821.8	5,184.3	8,834.1	4,981.9	.0199 *
Total Kcal moderate intensity	3,904.4	4,068.4	5,017.4	6,240.6	4,551.8	5,441.9	.2884
Total Kcal vigorous intensity	290.2	891.1	327.6	1,090.4	311.9	1,007.1	.8571

\*\* Correlation is significant at the 0.01 level (2-tailed)

### Results-Continued

- Mean disease duration was 8 years
- Over half of our patient group was overweight or obese (58.2%)
- The overweight/obese group expended more Kcal (p<0.0413) on social activities than the normal/underweight group
- The overweight/obese group was more likely to take medication for depression but had fewer falls (p<0.0386) than the lower BMI group
- Underweight/normal weight PD patients expended fewer (p<0.0406) Kcal then did overweight/obese patients
- Overweight/obese patients expended more Kcal (p<0.0199) on light activities than the underweight/normal group. There were no differences in self-reported pain, fatigue, memory problems, need for general assistance, depression, or quality of life between the two weight groups
- Patients from both groups spent 47% of DEE on physical activities (i.e., grocery shopping, household tasks), 15% on intellectual activities, 15% on ADLs, 12.5% on social activities, and 10.4% watching TV
- Only 14% of all patients reported engaging in vigorous activities

### Conclusions

- Over half our patient cohort was overweight or obese as opposed to other studies reporting weight loss in PD patients
- More studies on obesity and associated co-morbidities in PD are indicated
- PD patients need physical therapy and occupational therapy referrals to promote increased activity
- We recommend caregiver and patient counseling regarding the importance of cognitive and physical activities

