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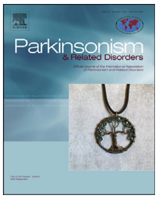

Sex disparities in health and health care utilization after Parkinson diagnosis: Rethinking PD associated disability

Michelle E. Fullard [a, *], Dylan P. Thibault [a, b], Veronica Todaro [c], Susan Foster [c], Lori Katz [c], Robin Morgan [c], Drew S. Kern [d, j], Jason M. Schwalb [e, j], Enrique Urrea Mendoza [f, j], Nabila Dahodwala [a, j], Lisa Shulman [g, j], Allison W. Willis [a, b, h, i, j]

[a] *Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA*
[b] *Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania, Philadelphia, PA, USA*
[c] *Parkinson's Foundation Women in PD Initiative, New York, NY, USA*
[d] *Department of Neurology, University of Colorado, Denver, CO, USA*
[e] *Department of Neurosurgery, Henry Ford Medical Group, Detroit, MI, USA*
[f] *Greenville Health System University Medical Group, Greenville, SC, USA*
[g] *Department of Neurology, University of Maryland School of Medicine, Baltimore, MA, USA*
[h] *Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, PA, USA*
[i] *Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania, Philadelphia, PA, USA*
[j] *Parkinson Study Group Healthcare Outcomes and Disparities Working Group, Rochester, NY, USA*

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ABSTRACT

Objective: To examine sex differences and trends in comorbid disease and health care utilization in individuals with newly diagnosed Parkinson disease (PD).
Design: Retrospective cohort study.
Participants: Over 133,000 Medicare beneficiaries with a new PD diagnosis in 2002 followed through 2008.
Methods: We compared the prevalence and cumulative incidence of common medical conditions, trends in survival and health care utilization between men and women with PD.
Results: Female PD patients had higher adjusted incidence rate ratio (IRR) of depression (IRR: 1.28, 1.25–1.31), hip fracture (IRR: 1.51, 1.45–1.56), osteoporosis (3.01, 2.92–3.1), and rheumatoid/osteoarthritis (IRR: 1.47, 1.43–1.51) than men. In spite of greater survival, women with PD used home health and skilled nursing facility care more often, and had less outpatient physician contact than men throughout the study period.
Conclusions: Women experience a unique health trajectory after PD diagnosis as suggested by differing comorbid disease burden and health care utilization compared to men. Future studies of sex differences in care needs, care quality, comorbidity related disability, PD progression, and non-clinical factors associated with disability are needed to inform research agendas and clinical guidelines that may improve quality survival for women with PD.

1. Introduction

Parkinson disease (PD) is a common, neurodegenerative condition that primarily affects older adults. While the incidence of PD is consistently found to be higher in men, more recent research has found sex differences in motor and non-motor features as well [1–4]. Women have a slightly older age of onset, are more likely to present with tremor and have a shorter time to and higher likelihood of developing motor fluctuations (particularly levodopa induced dyskinesias) [5,6]. Despite a higher propensity to develop motor fluctuations, women are less likely to receive the most efficacious treatment for fluctuations, deep brain stimulation surgery [7–9]. Non-motor features also differ between the sexes, with women more often reporting or displaying depression, fatigue, nervousness, constipation, pain, and restless legs, as well as

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[*] Corresponding author. University of Pennsylvania, Department of Neurology, 3400 Spruce Street, Philadelphia, PA 19104, USA.
E-mail address: Michelle.Fullard@uphs.upenn.edu (M.E. Fullard).

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reporting higher disability and lower quality of life [1,2,10,11]. Conversely, excessive daytime sleepiness, drooling and sexual problems were found to be more common and severe in men with PD [12,13].

PD epidemiology and outcomes research studies have generally been limited to academic center populations and focus on classic PD motor and non-motor symptoms, ignoring other determinants of health and health care use. Unfortunately, limited to no data are available on populations not adequately represented in clinical trials or academic centers, particularly women. Administrative data not only allow for the study of these populations, but also afford the opportunity to study a decline in health in ways a clinic based study cannot. Increased use of health care services may suggest barriers to preventative and therapeutic disease management, increased susceptibility to adverse outcomes, or lack of social support. Improving quality survivorship for PD requires a better understanding of how health and health care use changes after PD diagnosis. To address this gap in knowledge, we identified 133,133 Medicare beneficiaries with a new diagnosis of PD and examined sex differences in the incidence of comorbid disease, health care service use and survival.

2. Methods

This study was approved by the human studies research office of the University of Pennsylvania Perelman School of Medicine.

2.1. Design

This was a retrospective cohort study of Medicare beneficiaries diagnosed with PD in the year 2002 and followed through December 31, 2008. Medicare is a government-mandated insurance program used by 98% of adults aged 65 years and older and a portion of the disabled population below the age of 65.

2.2. Participants

Medicare beneficiaries with an incident PD diagnosis in the year 2002 were identified using the Centers for Medicare & Medicaid Services (CMS) Carrier file, which contains diagnosis and treatment claims for provider services. We required that a beneficiary have at least two years of Medicare eligibility prior to a new claim for Parkinson disease (ICD-9 code “332.0”). Our case identification methods are published elsewhere [14], but briefly, the Carrier files were searched to identify beneficiaries with claims containing ICD-9 codes for “Parkinson disease” (332) or “Paralysis agitans” (332.0) [15]. Beneficiaries that had a diagnostic claim for “Secondary/Drug induced Parkinsonism” (332.1) or “Atypical Parkinson Syndromes” (333.0) were excluded. We also excluded those with PD who were younger than the age of standard Medicare eligibility (65 years) because these individuals likely have different clinical courses and health care needs.

Claims data from incident PD cases were then linked to the CMS Beneficiary Annual Summary File (BASF) from 2002 to 2008 using the beneficiary identification number. The BASF contains demographic variables (race, date of birth and sex), annual data on health service use, chronic/comorbid conditions and date of death.

The primary study outcomes were comorbid disease diagnosis and health service use. We examined survival through 2008 as a secondary outcome. We determined the frequency of a diagnosis of atrial fibrillation, acute myocardial infarction, depression, dementia, cataract, chronic obstructive pulmonary disease, congestive heart failure, diabetes, glaucoma, hip fracture, ischemic heart disease, osteoporosis, rheumatoid arthritis/osteoarthritis, stroke, breast cancer, uterine cancer, lung cancer, and prostate cancer. Diagnosis dates were used to examine the timing of comorbid disease relative to PD diagnosis.

Health care utilization analyses were performed on the subpopulation of newly diagnosed PD patients that were still alive at the end of the observation period (December 31, 2008) to minimize survival and perceived futility bias. We extracted BASF data on annual use of home health care, skilled nursing facility care, and hospice services by beneficiaries with PD. Home health care services are covered by Medicare when the beneficiary is determined by a provider to be homebound. Skilled nursing facility care in our dataset includes both services provided in an acute rehabilitation facility as well as initial services in a chronic nursing facility.

2.3. Statistical methods

The primary focus of this study was to examine sex differences in health and health care service use; all analyses were either stratified by sex or compared women to men. Baseline patient characteristics and comorbid conditions were determined using data from the year 2002. Follow-up time for each patient was calculated as time to event, time to death or time to end of study, whichever came first. We calculated the cumulative incidence (per 100 PD patient years) of each comorbid diagnosis from 2003 through the end of 2008. Incident rate ratios (IRR) were calculated to compare selected comorbid diseases by sex. Models were adjusted for age at PD diagnosis and race.

Health service use was calculated annually and reported as the proportion (crude prevalence) of the PD population in receipt of a given service. Trends in health service utilization from 2002 to 2008 were stratified by sex. Generalized estimating equations (GEE) and logistic regression using binary or poisson distribution were used to estimate health service utilization while adjusting for year, sex, age at diagnosis, race and comorbid conditions. Cox proportional hazards models were used to estimate the risk of death associated with sex, adjusting for race, age and comorbid disease. The time to event variable was measured in months from January 1, 2002 to the date of death. Surviving cases were censored on December 31, 2008. All statistical analyses were generated using SAS software, Version 9.4.

3. Results

3.1. Patient characteristics

A total of 133,133 Medicare beneficiaries with a diagnosis of PD

Table 1
Demographic characteristics of 133,133 medicare beneficiaries with incident diagnosis of Parkinson disease.

Characteristic	Women n (%) 70,458 (52.9)	Men n (%) 62,675 (47.1)	Chi Square, p-value
Race/Ethnicity			<0.0001
White	63,466 (90.1)	57,153 (91.2)	
Black	4691 (6.7)	3422 (5.5)	
Asian	741 (1.1)	718 (1.2)	
Hispanic	1532 (2.2)	1362 (2.2)	
Native American	28 (0.0)	22 (0.0)	
Age group			<0.0001
67-69	4347 (6.2)	4830 (7.7)	
70-74	10,829 (15.4)	11,617 (18.5)	
75-79	16,281 (23.1)	16,194 (25.8)	
80-85	20,939 (29.7)	18,424 (29.4)	
85+	18,062 (25.6)	11,610 (18.5)	

Data shown are number (percent).

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