

# ELDERLY INDIVIDUALS WITH PARKINSON'S DISEASE: AN ASSESSMENT OF IMPAIRMENT AND FUNCTIONAL ABILITY

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## IDOSOS COM DOENÇA DE PARKINSON: AVALIAÇÃO DO COMPROMETIMENTO E DA CAPACIDADE FUNCIONAL

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## ANCIANOS CON ENFERMEDAD DE PARKINSON: EVALUACIÓN DEL ESTADIO Y DE LA CAPACIDAD FUNCIONAL

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**Objective:** to assess the functional ability and degree of impairment caused by Parkinson's disease among elderly individuals. **Method:** quantitative cross-sectional study with descriptive and exploratory analysis. A sample of 50 elderly individuals with Parkinson's disease was recruited from an association in the south of Brazil. The Hoehn and Yahr Scale and Functional Independence Measure were adopted in this study and the demographic and clinical characteristics were also verified. **Results:** 50% of the individuals presented mild disability; 32% moderate disability; and 18% presented severe disability caused by Parkinson's disease. In regard to degree of independence, 58% presented complete or modified independence; 32% presented modified dependence in up to 25% of tasks; and 10% of the sample presented modified dependence in up to 50% of tasks. **Conclusion:** the assessment of functional ability and degree of impairment caused by Parkinson's disease among elderly individuals reveals that greater impairment caused by the disease resulted in greater functional disability.

**Descriptors:** Elder. Chronic Disease. Parkinson Disease. Geriatric Assessment.

*Objetivo: avaliar a capacidade funcional e o grau de comprometimento dessa capacidade causado pela doença de Parkinson em idosos. Método: pesquisa quantitativa, de corte transversal, com análise descritiva e exploratória. Uma amostra com 50 idosos com doença de Parkinson foi recrutada em uma associação de Parkinson no Sul do Brasil. Foram utilizadas as Escalas de Hoehn e Yahr e a Medida de Independência Funcional e investigadas as características demográficas e clínicas. Resultados: apresentaram comprometimento leve 50% dos idosos; 32%, comprometimento*

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*moderado; e 18%, comprometimento grave pela doença de Parkinson. Referente ao grau de independência, 58% apresentou independência completa ou modificada; 32%, dependência modificada em até 25% das tarefas; e 10% da amostra apresentou dependência modificada em até 50% das tarefas. Conclusão: a avaliação da capacidade funcional e do grau de comprometimento causado pela doença de Parkinson em idosos mostrou que o maior grau de comprometimento causado pela doença resultava em capacidade funcional mais prejudicada.*

*Descritores: Idoso. Doença Crônica. Doença de Parkinson. Avaliação Geriátrica.*

*Objetivo: evaluar la capacidad funcional y el grado de evolución, de esa capacidad, causado por la enfermedad de Parkinson, en ancianos. Método: investigación cuantitativa, de corte transversal, con análisis descriptivo y exploratorio. Una muestra con 50 ancianos con enfermedad de Parkinson fue reclutada en una asociación de Parkinson, en el Sur de Brasil. Fueron utilizadas las Escalas de Hoehn e Yahr y la Medida de Independencia Funcional; también, fueron investigadas las características demográficas y clínicas. Resultados: debido a la enfermedad de Parkinson: 50% de los ancianos presentaron estadio leve; 32%, estadio moderado; y, 18% estadio grave. En relación al grado de independencia, 58% presentó independencia completa o modificada; 32% dependencia modificada en hasta 25% de las tareas; y, 10% de la muestra presentó dependencia modificada en hasta 50% de las tareas. Conclusión: la evaluación de la capacidad funcional y del grado de evolución causado por la enfermedad de Parkinson, en ancianos, mostró que el mayor grado de evolución causado por la enfermedad resultaba en una capacidad funcional más perjudicada.*

*Descriptores: Anciano. Enfermedad Crónica. Enfermedad de Parkinson. Evaluación Geriátrica.*

## Introduction

Recently, one of the most debated topics in the health field has been population aging. This phenomenon is linked to changes in health indicators such as decline in mortality and fertility and expressive increase in life expectancy<sup>(1)</sup>. The aging of the world population, especially the Brazilian population, has been accompanied by chronic health conditions<sup>(2)</sup>.

Aging is seen as something natural in which there is gradual decline in an individual's functional reserve, which is called senescence<sup>(3)</sup>. Additionally, the emergence of noncommunicable diseases (NCDs), which are incurable and permanent processes, tend to have a greater expression in older age and often lead to some degree of disability. These diseases are prevalent worldwide and are the main cause of health problems in both developing and developed countries<sup>(4)</sup>.

Among the NCDs that are common among the elderly, Parkinson's Disease (PD) stands out as the second most common neurodegenerative disease worldwide. Characterized by the loss of dopaminergic neurons in the nigrostriatal pathway, PD is classified as a progressive and chronic disease<sup>(5)</sup>. One study conducted in

the United States estimates that the number of individuals with PD without dementia will double by 2060 while those with PD and dementia will triple by the same year<sup>(6)</sup>.

PD has characteristics, which may cause functional changes, making individuals more dependent and requiring greater assistance, such as tremor, slowness of movement and even cognitive changes<sup>(5)</sup>. Therefore, performing a functional assessment of elderly individuals with PD is essential to identify their real needs and develop technologies to provide excellent health care. Note that any investigation at the level of health services collaborates with multidisciplinary teams, helping them implement actions intended to improve the level of patients' independence.

Therefore, the objective of this study is to assess functional ability and degree of impairment caused by Parkinson's disease among elderly individuals.

## Method

This study has a quantitative and cross-sectional approach with a descriptive exploratory analysis of data.

It was conducted in the homes of elderly individuals with PD. The search was conducted in the records of an organization for people with PD called Santa Catarina Parkinson Association, a civil, non-profit association intended to bring people with PD together, developing and supporting interventions to improve quality of life, among other aspects.

A total of 89 individuals 60 years old or older were found in the association's records. The telephone numbers of 25 people did not exist; seven had died; one had moved away; five refused to participate; and one could not read or write. A total of 50 elderly individuals remained, thus, 50 individuals 60 years old or older diagnosed with PD and enrolled in the aforementioned association participated in this study. When the N elements of a study is equal to or fewer than 80, it is recommended that the sample is composed of the N total elements, that is, it is advisable to carry out a quantitative survey (census), thus, the entire population of 50 individuals composed this study's sample and took part in the study<sup>(7)</sup>.

The individuals were contacted through telephone calls, when the study's objectives were explained and a home visit was proposed to provide a more detailed presentation of the study. During visits, participants and caregivers received clarification about the free and informed consent.

The study was approved by the Institutional Review Board at the Federal University of Santa Catarina (UFSC), according to Opinion Report No. 26676614.5.0000. The study is in accordance with Brazilian and international guidelines regarding research addressing human subjects.

Data were collected in August and September 2014 using the following instruments:

- a) questionnaire addressing sociodemographic (demographic and clinical) information, including sex, age, educational level, marital status, and time since diagnosis;
- b) Functional Independence Measure (FIM), instrument that allows performing a quantitative assessment of the level of

assistance demanded by an individual in order to perform motor and cognitive activities of daily living<sup>(8)</sup>. The FIM assesses 18 categories, scored from one to seven, and grouped into six dimensions: self-care (feeding, grooming, bathing, upper body dressing, lower body dressing, toileting); sphincter control (bladder, bowel); transfers (to bed, chair, wheelchair, to toilet, and to tub or shower); locomotion (walk, wheelchair; stairs); communication (comprehension and expression); and social cognition (social interaction, problem solving and memory). The maximum score (126 points) indicates complete independence while the minimum score (18 points) indicates complete dependence. The levels of functional dependence were classified according to FIM's total score: up to 18 indicate complete dependence; from 19 to 60 points indicate modified dependence (i.e., requires assistance up to 50% of tasks); from 61 to 103 points indicate modified dependence (requires assistance up to 25% of tasks); and scores from 104 to 126 points indicate complete/modified dependence<sup>(9)</sup>;

- c) Hoehn and Yahr Scale to assess level of disability or degree of impairment – it provides an estimate of the clinical condition of an individual with PD, focusing on the severity of motor symptoms and relative degree of impairment caused by the disease, which enables determining the stage of the disease<sup>(10)</sup>. This scale is applied by the researcher him/herself, who observes an individual and establishes a clinical picture, electing one of eight stages of impairment: zero indicates there is no sign of disease; stage 1 indicates unilateral involvement only; 1.5 indicates unilateral and axial involvement; 2 indicates bilateral involvement without impairment of balance; 2.5 indicates bilateral involvement with mild impairment of

balance; 3 indicates bilateral involvement with mild to moderate impairment of balance; 4 indicates severe impairment but individual is still able to stand without assistance; and 5 indicates the individual is bound to a wheelchair or bedridden, and requires complete assistance<sup>(11)</sup>. In this study, the levels were grouped and divided into mild (0-2), moderate (2.5-3) and severe impairment (4-5).

Data were entered and stored in Microsoft® Excel®. Statistical analysis was conducted with an online computational tool, SestatNet®<sup>7</sup>. The descriptive analysis of data yielded mean, median absolute and relative frequencies. The exploratory analysis was performed with the

Kruskal-Wallis ANOVA. The level of significance was set at 5% ( $p < 0.05$ ).

## Results

In regard to the participants, there was a predominance of women (52%), married (68%), who completed middle school (54%), and were 71.6 years old on average (SD=7.49). The distributions of elderly individuals between 60-69 years old and between 70-79 years old were equivalent; each group corresponded to 42% of the sample. Additionally, individual analysis according to gender revealed that the age of men ranged from 61 and 85 years old and the age of women ranged from 60 and 88 years old (Table 1).

**Table 1** – Distribution of elderly individuals with Parkinson's disease according to sociodemographic characteristics. Florianópolis, Santa Catarina, Brazil – 2014 (N=50)

<b>Sociodemographic Characteristics</b>	<b>Absolute Frequency n</b>	<b>Relative Frequency %</b>
<b>Sex</b>		
Female	26	52
Male	24	48
<b>Age group</b>		
60 – 69 years old	21	42
70 – 79 years old	21	42
80 – 89 years old	8	16
<b>Marital Status</b>		
Married	34	68
Single	4	8
Widowed	6	12
Divorced	6	12
<b>Educational Level</b>		
Higher education	14	26
High School	9	20
Middle School	27	54

Source: Created by the authors

Most of this study's participants had the disease from one to five years, that is, 40% of the sample. This group is 66.6 years old on average, median of 65, and standard deviation of 6.17 years. The groups diagnosed between six and 10 years ago and between 11 and 15 years ago, represented each 24% of the sample. The group diagnosed between six and 10 years ago was 71.8 years old on average, median of

73.5 and standard deviation of 6.04 years. The group diagnosed from 11 to 15 years was 75.4 years old, median of 74.5 and standard deviation of 7.4. Patients diagnosed 16 or more years ago represented only 12% of the sample and were 75.4 years old on average, median of 75.5 and standard deviation of 7.26 years.

In regard to degree of impairment caused by the disease, the results obtained by the Hoenh

and Yahr Scale reveal that 50% of the total sample presented mild disability, 32% presented moderate, and 18% presented severe disability.

The functional ability of elderly individuals with PD was assessed using FIM, in which 58% presented complete or modified independence; 32% modified dependence in up to 25% of the tasks; and 10% presented modified dependence in up to 50% of the tasks. Total dependence was not identified in this sample.

Analysis of the relationship between loss of functional ability and aging among elderly

individuals with PD performed with FIM is presented in Table 2. The results show that independence was even more compromised with age, that is, the older the individual the more likely s/he will depend on assistance. Among those between 60-69 years old and between 80-89 years old, the dimension most affected was self-care while individuals aged between 70-79 years old presented greater impairment in the locomotion dimension.

**Table 2** – Dimensions of functional independence *versus* age group. Florianópolis, Santa Catarina, Brazil – 2014

Age group	Dimensions of Functional Independence					
	A	B	C	D	E	F
60-69	5.77	6.13	6.08	5.83	6.12	6.00
70-79	5.26	5.75	5.38	5.21	5.55	5.48
80-89	3.55	4.01	3.95	3.81	3.94	3.84

Source: Created by the authors.

Legend: A = Self-care. B = Sphincter control. C = Transfers. D = Locomotion. E = Communication. F = Social Cognition.

Table 3 presents the relationship between functional ability and degree of disability caused by PD. Data revealed there is a statistically significant relationship between the variables ( $p < 0.001$ ). The dimensions of functional independence most affected among the elderly

individuals who presented mild and severe disability caused by PD were self-care and locomotion. The performance of those with moderate disability was mostly affected in terms of social cognition and self-care.

**Table 3** – Dimensions of functional independence *versus* Hoehn and Yahr Scale. Florianópolis, Santa Catarina, Brazil – 2014

Degree of Disability	Dimensions of Functional Independence					
	A	B	C	D	E	F
Mild	5.98	6.18	6.16	5.98	6.08	6.25
Moderate	5.16	5.84	5.62	5.31	5.41	5.01
Severe	3.11	3.76	3.13	3.11	4.22	3.93

Source: Created by the authors

Legend: A = Self-care. B = Sphincter control. C = Transference. D = Locomotion. E = Communication. F = Social Cognition.

## Discussion

The characterization of elderly individuals with PD, investigation of the degree of disability

caused by the disease, and the individuals' degree of independence represent an important advancement for health and nursing practices, considering this information enable the

development of nursing care technologies specific for this population.

Most of this study's sample is composed of women (52%), which corroborates the findings of another study<sup>(12)</sup> also addressing elderly individuals with PD, in which the sample was composed of 69% of women. In another study<sup>(13)</sup> addressing patients with PD, men presented a greater incidence of the disease in all age groups, though this difference was statistically significant only for those between 60-69 years old and between 70-79 years old ( $p < 0.005$ ). The Brazilian elderly population is mostly composed of women (53%); women have greater longevity than men. This context is not different in Santa Catarina, where 55% of the elderly population is composed of women, which justifies the fact that the sample is mostly composed of female individuals<sup>(14)</sup>.

This study's participants were aged 71.6 years old on average ( $SD = 7.49$ ), similar to information reported by other studies addressing people with Parkinson's disease<sup>(15)</sup>.

In regard to the quality of life of individuals with PD, the literature<sup>(11,16)</sup> shows that in terms of sociodemographic profile, patients are usually married and either had complete/incomplete middle school. These findings agree with those found in this study in which 54% of the participants had completed middle school and most (68%) were married.

Of the 50 elderly individuals with PD, 50% presented mild disability, 32% moderate and 18% presented severe disability. A study verifying balance among patients with Parkinson's disease<sup>(17)</sup> reports the participants presented mild to moderate disability, which is in agreement with this study, that is: unilateral disease with unilateral and axial involvement; or bilateral disease, without impairment of balance; or bilateral disease with mild impairment of balance; or bilateral disease with mild to moderate impairment of balance. This result reveals that the individuals experienced greater difficulty in keeping their balance while simultaneously performing a second task.

This study's results show that elderly individuals with moderate impairment obtained the worse performance in the social cognition dimension. This finding may be explained by the fact that one of the determinants of PD physiopathology is characterized by symptoms that compromise speech and also the fact that typical and atypical disfluencies affect cognition, with aging and duration of the disease, occasionally affecting social interactions, problem solving capacity, and memory<sup>(18)</sup>.

This study shows that 58% of the elderly individuals presented complete or modified independence; 32% presented modified dependence up to 25% of the tasks, and 10% presented modified dependence in up to 50% of the tasks. Most of the participants with PD addressed by one study<sup>(19)</sup> and assessed with FIM also presented complete or modified independence. One explanation is that both studies were conducted with elderly individuals receiving outpatient care and taking part in activities and events promoted by a non-profit organization directed to people with PD, that is, elderly individuals more socially and physically engaged and active.

Regarding the relationship between age and functional ability, the individuals between 80-89 years old addressed in this study presented, according to FIM, a greater level of dependence compared to their younger counterparts aged between 60-79 years old. One study<sup>(20)</sup> addressing functional dependence and associated factors among elderly individuals verified that functional dependence was associated with: being a woman, being 80 years old or older, hospitalizations, and chronic diseases. Due to the progression of chronic diseases and the relationship between aging and functional ability, the combination of both may impose limitations in the routine of elderly individuals, leading them to depend on assistance to perform daily living activities.

In this study, statistically significant association was found between the variables degree of disability caused by PD and functional ability. This result, combined with the progression and impairment caused by PD, reveals a need for

nurses to recommend the practice of physical exercises, as exercises are efficient in improving components of functional ability among individuals with PD, especially coordination and strength. Results are beneficial including improved quality of life and ability to perform daily tasks<sup>(21)</sup>.

Previous studies<sup>(22)</sup> analyzing the variables “roll in bed” and “rate of falls” among patients with PD and correlating degree of disability caused by the disease using the Hoehn and Yahr Scale, report that the greater the disability caused by PD the greater the rate of falls and difficulty to move, reinforcing changes caused by PD in terms of mobility. This study confirms these findings, as the dimension of functional independence most compromised among individuals aged between 70-79 was locomotion.

This study’s findings are relevant because they show the degree of disability affecting daily activities while routine activities include simultaneous and different tasks so there is a need to implement a nursing care plan that is directed to this population including care actions that decrease the risk of performing daily living activities.

Therefore, nurses, together with a multidisciplinary team, should establish goals to decrease the risk of falls among these individuals, specifically: provide health education to patients and their families; make an environmental assessment of their homes; counsel patients to wear safe shoes and walking aids (e.g., walkers, canes, or wheelchairs); implement safety devices at home (e.g., stair railing and grab bars), and eliminate risk factors (e.g., wet floors, carpets, excessive number of furniture in the domestic environment)<sup>(23)</sup>.

The limitations of this study include the sample size, cross-sectional design, and the fact the participants were recruited from a specific association. Therefore, this study’s results cannot be generalized considering its participants live in the urban area and also because the findings refer to the specific familial, developmental, social, and context of those who took part in this study. Nonetheless, because PD is an

incapacitating disease that is more common in advanced age, this study is important for the scientific community as well as workers from multidisciplinary teams, especially nurses, to strengthen social and health public policies directed to elderly individuals with PD.

## Conclusion

This study shows that older elderly individuals with PD experience greater dependence to perform tasks when compared to their younger counterparts. Analysis of the relationship between functional ability and degree of disability caused by the disease reveals that those with mild or severe impairment were more functionally dependent in terms of self-care and locomotion. Elderly individuals with moderate difficulty required greater assistance in the dimensions related to social cognition and self-care.

Assessing the individuals’ functional ability and degree of impairment caused by PD is an important task to be performed by nurses in order to monitor the performance of daily living activities and seek treatments to promote greater independence of patients, even those with chronic health conditions.

Further studies are important to address nursing care provided to individuals with PD, however, an in-depth assessment of aspects that influence the routine of these individuals is required together with the planning of actions and implementation of health care actions, especially on the part of nurses.

## Collaborations:

1. conception, desing, analysis and interpretation of data: Rafaela Baptista and Angela Maria Alvarez;

2. writing of the article and relevant critical review of the intellectual content: Rafaela Baptista, Angela Maria Alvarez, Simony Fabíola Lopes Nunes, Rafaela Vivian Valcarenghi and Lívia Maia Pascoa;

3. final approval of the version to be published: Simony Fabíola Lopes Nunes, Rafaela Vivian Valcarenghi and Lívia Maia Pascoa.

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