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Assessment of risk of falls in people with Parkinson's disease[a]

Avaliação do risco de quedas entre pessoas com doença de Parkinson

Evaluación del riesgo de caídas en personas con enfermedad de Parkinson

Franciny da Silva[1]
Angela Maria Alvarez[2]
Simony Fabíola Lopes Nunes[3]
Maria Eduarda Massari Silva[1]
Silvia Maria Azevedo Dos Santos[2]

1. Universidade Federal de Santa Catarina, Departamento de Enfermagem. Florianópolis, SC, Brasil.

2. Universidade Federal de Santa Catarina, Programa de Pós-Graduação em Enfermagem. Florianópolis, SC, Brasil.

3. Universidade Federal do Maranhão, Departamento de Enfermagem. Imperatriz, MA, Brasil.

ABSTRACT

Objective: to identify the factors associated with risk of falls among people with Parkinson's disease registered at the Parkinson Santa Catarina Association. **Method:** this is a cross-sectional exploratory descriptive study with a quantitative approach, carried out with 53 people registered at the Parkinson Santa Catarina Association, in the city of Florianópolis, Brazil, from June to September 2019. Sociodemographic questionnaire, Hoehn and Yahr scale, Mini Mental State Examination and Simple Screening Test for Risk of Falls in the Elderly were applied. The data were tabulated and analyzed using the SEstatNet® Statistics Teaching-Learning Online System. **Results:** risk factors were identified, such as sex, increased age, reduced muscle strength, postural instability and decreased gait speed. Regarding the stages of the disease, it was found that in all of them there was a worsening of gait speed and the fear of falling is constant, increasing with the worsening of the disease and diagnosis time. **Conclusion and implications for practice**: by deepening the study of the topic, nurses are able to understand the motor impairments that lead to frailty and fall in people with Parkinson's disease, developing strategies to prevent them.

Keywords: Accidental Falls; Chronic Disease; Parkinson's Disease; Nursing; Aging.

RESUMO

Objetivo: identificar os fatores associados ao risco de quedas entre as pessoas com doença de Parkinson cadastradas na Associação Parkinson Santa Catarina. **Método:** estudo transversal exploratório descritivo e de abordagem quantitativa, realizado com 53 pessoas cadastradas na Associação Parkinson Santa Catarina, no município de Florianópolis, Brasil, no período de junho a setembro de 2019. Foram aplicados questionário sociodemográfico, Escala de Hoehn e Yahr, Mini Exame do Estado Mental e Teste de Rastreio do Risco de Queda no Idoso. Os dados foram tabulados e analisados por meio do Sistema *online* de Ensino-Aprendizagem de Estatística SEstatNet®. **Resultados:** foram identificados fatores de risco, como sexo, aumento da idade, redução da força muscular, instabilidade postural e diminuição da velocidade da marcha. Em relação aos estágios da doença, foi constatado que em todos houve piora da velocidade da marcha e o medo de cair é constante, aumentando com o agravamento da doença e o tempo de diagnóstico. **Conclusão e implicações para a prática:** ao aprofundar o estudo do tema, o enfermeiro consegue compreender os acometimentos motores que levam à fragilização e à queda em pessoas com doença de Parkinson, elaborando estratégias para preveni-las.

Palavras-chave: Acidentes por Quedas; Doença Crônica; Doença de Parkinson; Enfermagem; Envelhecimento.

RESUMEN

Objetivo: identificar los factores asociados al riesgo de caídas en personas con enfermedad de Parkinson registradas en la Asociación de Parkinson Santa Catarina. **Método:** estudio descriptivo exploratorio transversal, con abordaje cuantitativo realizado con 53 personas registradas en la Asociación Parkinson Santa Catarina, en la ciudad de Florianópolis, Brasil, de junio a septiembre de 2019. Se aplicaron un cuestionario sociodemográfico, la Escala de Hoehn y Yahr, el Mini Examen del Estado Mental y la Prueba de Detección del Riesgo de Caídas en Ancianos. Los datos se tabularon y analizaron utilizando el Sistema en línea de enseñanza-aprendizaje de estadísticas SEstatNet®. **Resultados:** se identificaron factores de riesgo como sexo, mayor edad, disminución de la fuerza muscular, inestabilidad postural y disminución de la velocidad de la marcha. En cuanto a las etapas de la enfermedad, se encontró que en todas ellas se produjo un empeoramiento de la velocidad de la marcha y el miedo a caer es constante, aumentando con el empeoramiento de la enfermedad y el momento del diagnóstico. **Conclusión e implicaciones para la práctica:** al profundizar en el estudio del tema, el enfermero es capaz de comprender las deficiencias motoras que conducen a la fragilidad y caída en personas con enfermedad de Parkinson, ideando estrategias para prevenirlas.

Palabras clave: Accidentes por Caídas; Enfermedad Crónica; Enfermedad de Parkinson; Enfermería; Envejecimiento.

Corresponding author:
Franciny da Silva.
E-mail: franciny_s@hotmail.com

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INTRODUCTION

Parkinson's disease (PD) is the second most frequent chronic neurodegenerative disease in people aged between 55 and 65 years.[1] In PD, dopaminergic cells die, causing changes in the production of dopamine, a neurotransmitter responsible for movement. The death of these structures generates lack of coordination of movements and is evidenced in individuals by tremors and abnormal slowness of body mobility and performance of activities.[2]

These functional changes interfere in the daily lives of individuals with PD, both in the performance of activities of daily living, related to mobility or maintenance of the intention of environment integrality, which are carried out more slowly and with greater physical effort, in terms of quality of life, having a negative impact on it.[3-5]

Due to the motor and non-motor changes that the disease provides, individuals with PD have a higher risk of accidents due to falls when compared to healthy controls.[6] Fall is characterized as an event in which individuals, unintentionally, go to a lower level than they previously occupied, with or without loss of consciousness, without having the ability to correct the situation in a timely manner,[7] with 45% and 68% of people with the disease falling each year, with a proportion between 50 and 86% falling recurrently.[8] Women of any age are more exposed to risk of falling, while in men, this risk increases with advancing age.[8]

Given the magnitude of the problem, the approach to the topic of risk of falls among people with PD is justified by the motor impairment caused by the disease. The experience with people with the disease helped to understand and monitor the losses and physical-functional impairments presented by participants, both by report and by observation of the characteristic of each individual's gait, such as slow and shuffling walking, with short steps and the trunk bent forward. In addition to the early signs of aging, such as signs of tiredness when performing activities, decreased hearing and vision, the appearance of gray hair and lack of attention, they were noticed, even in people under 60 years of age.[9]

Thus, driven by current trends that suggest a continuous increase in the prevalence and burden of PD, we believe that approaches to the disease should be carried out in search of evidence to help the management of people with PD.[1] The question that guided this study was: what is the risk of falls among people with PD registered with the Parkinson Santa Catarina Association? To answer this question, the objective outlined was to identify risk of falls among people with PD registered in the Parkinson Santa Catarina Association.

METHOD

This is a descriptive, cross-sectional exploratory study with a quantitative approach. It took place at the Parkinson Santa Catarina Association (APASC - *Associação Parkinson Santa Catarina*), which brings together people with PD and their families, to involve them in social activities and health education, with the aim of supporting social inclusion and maintaining quality of life.

The groups linked to APASC in partnership with higher education institutions are: the Support Group for People with Parkinson's Disease and Their Families and Caregivers (GAM-Parkinson), coordinated by nursing professors; Vocal Therapy Group for Parkinson's Patients, under the coordination of the Speech-Language Pathology undergraduate course; Parkinson's Disease Rehabilitation Group; and Rhythm and Movement Project, coordinated by physiotherapy and physical education.

Through the aforementioned projects, APASC provides activities for people with PD and their family caregivers to remain inserted in social life and participating in specific and programmed activities, to contribute to the maintenance of their physical, social and health care conditions. Moreover, they are research and teaching spaces for undergraduate and graduate students.

As a criterion for inclusion in the research, it was established that those who responded to telephone and/or personal contact would be included, regardless of age or sex, while the exclusion criterion was to have a Mini Mental State Examination (MMSE) score of less than 24. Sample data were collected, consisting of 53 individuals, taking into account the interest of those registered to participate in the collection and the score greater than 24 on the MMSE.[10] Overall, 17 individuals were excluded, with 76.48% (n = 13) refusing to participate and 23.52% (n = 4) scoring less than 24 in the mini-exam.

The initial population of this study consisted of 85 individuals, of both sexes and of any age with a diagnosis of PD, registered at APASC and with telephone contact available. Based on a sample calculation with an error of 5% and a confidence level of 95%, a sample of 70 individuals with PD was defined.

Submitted to the Research Ethics Committee, at the *Universidade Federal de Santa Catarina* (CEPSH - UFSC), the project was approved under Opinion 3,344,818. Data collection was carried out from June to September 2019. Through personal contact, the professionals responsible for the groups were asked if they agreed that people with PD were approached and answered questionnaires and the application of a scale in the places where the groups were held, before the beginning or after the end. After obtaining consent, the researcher began to speak by telephone with participants, explaining about the objective of the research, risks and benefits, interview duration, which would be 25 to 30 minutes, culminating in asking whether they were interested in participating or not. It was clarified that there would be no harm in continuing the activities offered by APASC. If they agreed, they were asked what place, date and time would be most convenient. Collections were carried out by two researchers linked to the GAM-Parkinson, and took place at home, at APASC premises and at the places of the described activity groups, according to participants' availability.

The instruments used for collection were: sociodemographic questionnaire with information such as name, sex, age, education level, marital status, diagnosis time, use or not of medications and their doses and time of the last dose of levodopa on the day

of the interview; the MMSE, to verify individuals' aptitude for the activities proposed by the research; the Hoehn and Yahr Scale (HY), to verify at which stage of PD individuals were; and the Simple Screening Test for Risk of Falls in the Elderly (Q22P), to determine risk of accidents due to falls in daily routine. The best cut-off point that provides good Q22P sensitivity and specificity is a score of 6.5; above this value indicates a risk of falling.[11]

During data collection, the interviewers emphasized the purpose of the research, requested that the Informed Consent Form (ICF) be read and, when necessary, doubts were resolved, as well as the benefits and risks of the research were explained. At that time, it was clarified to the participants that, if they felt uncomfortable or injured in any way, data collection procedures could be interrupted and resumed in another place and date. It was also explained about the instruments that would be applied, the average time their application would require and that, if they were interested in participating, they would have to sign the ICF. It was clarified to participants that if, in the future, they had any doubts about the research or wanted to withdraw their consent, they could call the telephone numbers or go to the places available in the ICF. After obtaining consent, data collection was started. Once the collection was completed, the data were organized in an Excel spreadsheet, with the name of each participant replaced by a number, in order to preserve their anonymity. The variables were added to each individual's line: sex, age, diagnosis time, marital status, education, presence or absence of pathologies other than PD, medications in use, MMSE value, HY and Q22P scores in total and the value of each item of the screening test's 22 questions.

For statistical analysis, the categorical variables studied were represented by absolute (n) and relative (percentage) frequency. Age and diagnosis time were represented by median and interquartile range (50^{th} percentile = P50 [25^{th} percentile = P25; 75^{th} percentile = P75]).

Quartiles of age and diagnosis time were described between groups at risk of falling using the cut-off point of 6.5 of the Q22P questionnaire. The distribution of risk of falling (final Q22P score) was compared between categorical variables studied by nonparametric tests, Mann-Whitney test, or Kruskal-Wallis. The representation was made by median and interquartile range (50^{th} percentile = P50 [25^{th} percentile = P25; 75^{th} percentile = P75]).

For individuals at risk of falls (n = 50), the effect of independent variables and the PD severity score (Hoehn and Yahr) were verified. The categorical variables studied were associated with the outcome of risk of falls using the chi-square test. The distribution of age and diagnosis time was compared between the categorical variables of Hoehn and Yahr using the Mann-Whitney test.

Spearman's correlation was performed to verify the degree of relationship between the Hoehn and Yahr score variables, age and diagnosis time with the final Q22P score variable. These analyzes were represented in a table. When significant, the strength of the correlation can be classified as: 0 – 0.3 = weak; 0.4 – 0.6 = regular; 0.6 – 0.9 = strong; and 0.9 - 1.0 = very strong.[12]

The level of significance adopted was 0.05. The software used to perform the analyzes was IBM-SPSS, version 25 (IBM, 2017).[13]

RESULTS

Most study participants, 60.40% (n = 32), were male, while 39.60% (n = 21) of the sample were female. The participants' mean age was 65.3 years, the median was 67, and the standard deviation was 10.60 years, with 43 years being the minimum age, and 90 years the maximum. Individuals aged 55 and older accounted for 84.90% (n = 45), those with a partner accounted for 67.90% (n = 36) and single individuals, 32.1% (n = 17) individuals in the sample. Regarding the level of education, 34% (n = 18) had completed higher education, 34% (n = 18), elementary school, 22.6% (n = 12), high school, and 9.4% (n = 5), graduate degree.

Diagnosis time was organized into five-year intervals. Thus, most participants, 41.50% (n = 22), had a diagnosis of five to nine years, followed by 35.80% (n = 19) of participants with diagnosis time of up to four years and 22.60% (n = 12) of individuals with diagnosis time of ten years or more. Individuals aged four years or less differed, having lower scores on the Q22P when compared to those with more than five years of diagnosis ($median_{5-9}$ = 11.0; $median_{10\ or\ +\ =}$ 11.5) (p = 0.048).

With the aging process, it is common for people to develop other pathologies associated with the primary diagnosis, as evidenced in the survey, in which 64.20% (n = 34) of participants had other health problems. However, 35.8% (n = 19) of the study subjects declared that they had no other diagnosis associated with PD.

Regarding participants with one or more associated diagnoses, 30% (n = 15) of individuals with a score ≥ 6.5 on the Q22P scale, which assesses risk of falling, had an associated comorbidity, 24% (n = 12), two pathologies, 8% (n = 4), three comorbidities and 2% (n = 1), four comorbidities. In individuals with scores below 6.5, 66.70% (n = 2) of individuals had two comorbidities, and 33.30% (n = 1), a pathology associated with PD. Among the comorbidities reported, systemic arterial hypertension predominated, with 66.67% (n = 18). A total of 34 people with associated comorbidities, followed by diabetes mellitus, with 18.52% (n = 5) and 14.81% (n = 4), declared having a diagnosis of prostatic hyperplasia in a sample composed mainly of men (data not tabulated).

Regarding the use of medications, it was found that 52.80% (n = 28) of individuals used less than five medications, and 47.20% (n = 25), five or more. Study participants who take more than five medications are more likely to fall (median = 12.0) compared to respondents who take fewer than five medications (median = 9.5) (p = 0.007).

In this survey, it was found that the predominant drug classes were those indicated for PD treatment, used by most people: 96.23% (n = 51) individuals used medication for PD, associated with medication for depression, 45.28% (n = 24) and 35.85% (n = 19) for hypertension.

Regarding specific medications for PD treatment, the three most used by participants, in descending order, were: prolopa, in 84.91% (n = 45) of the total sample, pramipexole, in 47.17%

(n = 25), and carbidopa, in 11.32% (n = 6). Other drugs were also mentioned, but in smaller quantities, such as entacapone and maintenance.

The stage of PD was assessed using the HY Scale, detecting the following degrees of impairment: mild, in 71.70% (n = 38) of the total number of participants; moderate and severe, in 28.30% (n = 15). The absolute and relative frequency by sex is shown below, in addition to the study's demographic, socioeconomic, behavioral and health variables (Table 1).

It was found that the study participants had a risk of falls as evidenced by the total score on the screening test Q22P: 94.30% (n = 50) scored higher than 6.5. Subjects scoring less than 6.5, 5.70% (n = 3) were all male.

After comparing the groups at risk of falling, the comparison/association between the studied variables and the severity of Hoehn and Yahr was performed only for those at risk of falling (n = 50), as shown in Table 2. Diagnosis time showed a significant difference between the severity groups (P = 0.027), in which the

Table 1. Description of the sample according to demographic, socioeconomic, behavioral and health variables. Florianópolis, SC, Brazil, 2019 (n = 53).

Variables	Total	Fall risk groups score		Score Q22P	P
		> = 6.5	<6.5		
	n (%) 53 (100)	n (%) 50 (94.3)	n (%) 3 (5.7)	P50 [P25; P75]	
Age					
<60 years	17 (32.1)	17 (34)	0 (0)	10 [9; 12]	0.367[1]
60 |-- 70 years	18 (34)	15 (30)	3 (100)	11.5 [8; 13]	
> = 70 years	18 (34)	18 (36)	0 (0)	12.5 [9; 14]	
P50 [P25; P75]	67 [57; 72]	67 [55; 72]	65 [65; 68]		
Sex					
Female	21 (39.6)	21 (42)	0 (0)	11 [9; 13]	0.293[2]
Male	32 (60.4)	29 (58)	3 (100)	10 [8; 13]	
Education					
Elementary school	18 (34)	17 (34)	1 (33.3)	11.5 [10; 15]	0.173[1]
High school	12 (22.6)	12 (24)	0 (0)	10.5 [8.5; 13]	
Higher education	18 (34)	17 (34)	1 (33.3)	10.5 [8; 13]	
Graduate degree	5 (9.4)	4 (8)	1 (33.3)	9 [9; 10]	
Marital status					
With a partner	36 (67.9)	33 (66)	3 (100)	11 [9; 13]	0.788[2]
Without a partner	17 (32.1)	17 (34)	0 (0)	10 [8; 13]	
Diagnosis time					
0 - 4 years	19 (35.8)	17 (34)	2 (66.7)	9a [8; 13]	**0.048**[1]
5 - 9 years	22 (41.5)	21 (42)	1 (33.3)	11b [10; 14]	
10 or more	12 (22.6)	12 (24)	0 (0)	11.5b [10.5; 14]	
P50 [P25; P75]	6 [3; 9]	6 [4; 9]	2.5 [0.6; 7]		
Comorbidity					
Yes	34 (64.2)	32 (64)	2 (66.7)	11 [9; 13]	0.765[2]
No	19 (35.8)	18 (36)	1 (33.3)	10 [8; 14]	
Medication					
<5 medications (n = 28)	28 (52.8)	25 (50)	3 (100)	9.5a [8; 11.5]	**0.007**[2]
> = 5 medications (n = 25)	25 (47.2)	25 (50)	0 (0)	12b [11; 14]	
Hoehn and Yahr					
Mild	38 (71.7)	35 (70)	3 (100)	10 [8; 13]	0.177[2]
Moderate/Severe	15 (28.3)	15 (30)	0 (0)	11 [10; 14]	

Source: data collection, 2019. Note: *1 - Kruskal-Wallis test; *2 - Mann-Whitney test; *P50: median; P25: 25th percentile; P75: 75th percentile. *In bold are the significant p-values. *Distinct letters represent statistically different distributions.

Table 2. Comparison of patients at risk of falls between the severities of Parkinson's disease (n = 50).

Variables	Total	Hoehn and Yahr		P
		Mild	Moderate/ Severe	
	n (%) 50 (100)	n (%) 35 (70.0)	n (%) 15 (30.0)	
Age[2]				
<60 years	17 (32.1)	13 (34.2)	4 (26.7)	0.811
60 |-- 70 years	18 (34.0)	13 (34.2)	5 (33.3)	
> = 70 years	18 (34.0)	12 (31.6)	6 (40.0)	
Age[1] - P50 [P25; P75]	67 [55; 72]	66 [55; 72]	67 [57; 76]	0.273
Sex[2]				
Female	21 (42.0)	15 (42.9)	6 (40.0)	>0.999
Male	29 (58.0)	20 (57.1)	9 (60.0)	
Education[2]				
Elementary school	17 (34.0)	12 (34.3)	5 (33.3)	0.972
High school	12 (24.0)	9 (25.7)	3 (20.0)	
Higher education	17 (34.0)	11 (31.4)	6 (40.0)	
Graduate degree	4 (8.0)	3 (8.6)	1 (6.7)	
Marital status[2]				
With a partner	33 (66.0)	21 (60)	12 (80.0)	0.333
Without a partner	17 (34.0)	14 (40)	3 (20.0)	
Diagnosis time[2]				
0 - 4 years	17 (34.0)	14 (40)	3 (20.0)	**0.028**
5 - 9 years	21 (42.0)	16 (45.7)	5 (33.3)	
10 or more	12 (24.0)	5 (14.3)	7 (46.7)	
Diagnosis time[1] - P50 [P25; P75]	6 [4; 9]	5.5 [3; 8]	9 [6; 11]	**0.027**
Comorbidity[2]				
Yes	32 (64.0)	22 (62.9)	10 (66.7)	>0.999
No	18 (36.0)	13 (37.1)	5 (33.3)	
Medications[2]				
<5 medications	25 (50.0)	16 (45.7)	9 (60.0)	0.725
> = 5 medications	25 (50.0)	19 (54.3)	6 (40.0)	

Note: *1 - Mann-Whitney test; 2 - chi-square test. Caption: P50: median; P25: 25th percentile; P75: 75th percentile. In bold are the significant p-values. Underlined is the cell with the highest percentage, indicating local association.

distribution of diagnosis time in individuals with mild severity (median = 5.5 years) was smaller, when compared to the distribution of time in patients with moderate or severe severity (median = 9 years). When categorized into three ranges, it maintains the result discussed above (P = 0.028).

Table 3 shows the descriptive analysis of each item in the Q22P questionnaire. Categories with more than 75% were underlined, to emphasize the most prevalent responses, these items being discriminated by the cut-off point of 6.5.

In Q1 of Q22P, 56.60% (n = 30) of individuals answered that they fell in the last year, 54.55% (n = 12) were female, 58.06% (n = 18) were male. Regarding Q2, 73.60% (n = 39) of individuals answered that in the last year they stumbled. However, most did not need help to climb stairs, as verified in Q3, in which 84.90% (n = 45) of the total sample answered that they did not need help.

Regarding the decrease in gait speed, evidenced by Q4, 90.60% (n = 48) of the total answered that there was a decrease, with 92% (n = 46) of individuals with a score higher than 6.5.

Table 3. Answers of the individuals interviewed in the application of the Q22P. Florianópolis, SC, Brazil. 2019 (n = 53).

Questions	Fall risk groups score					
	< = 6.5 points (n=50)		>6.5 points (n= 3)		Total (n=53)	
	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)
Q1	21 (42)	29 (58)	2 (66.7)	1 (33.3)	23 (43.4)	30 (56.6)
Q2	12 (24)	38 (76)	2 (66.7)	1 (33.3)	14 (26.4)	39 (73.6)
Q3	8 (16)	42 (84)	0 (0)	3 (100)	8 (15.1)	45 (84.9)
Q4	4 (8)	46 (92)	1 (33.3)	2 (66.7)	5 (9.4)	48 (90.6)
Q5	3 (6)	47 (94)	0 (0)	3 (100)	3 (5.7)	50 (94.3)
Q6	11 (22)	39 (78)	0 (0)	3 (100)	11 (20.8)	42 (79.2)
Q7	24 (48)	26 (52)	1 (33.3)	2 (66.7)	25 (47.2)	28 (52.8)
Q8	37 (74)	13 (26)	3 (100)	0 (0)	40 (75.5)	13 (24.5)
Q9	34 (68)	16 (32)	0 (0)	3 (100)	34 (64.2)	19 (35.8)
Q10	19 (38)	31 (62)	2 (66.7)	1 (33.3)	21 (39.6)	32 (60.4)
Q11	7 (14)	43 (86)	1 (33.3)	2 (66.7)	8 (15.1)	45 (84.9)
Q12	24 (48)	26 (52)	3 (100)	0 (0)	27 (50.9)	26 (49.1)
Q13	4 (8)	46 (92)	1 (33.3)	2 (66.7)	5 (9.4)	48 (90.6)
Q14	28 (56)	22 (44)	3 (100)	0 (0)	31 (58.5)	22 (41.5)
Q15	9 (18)	41 (82)	2 (66.7)	1 (33.3)	11 (20.8)	42 (79.2)
Q16	22 (44)	28 (56)	3 (100)	0 (0)	25 (47.2)	28 (52.8)
Q17	30 (60)	20 (40)	3 (100)	0 (0)	33 (62.3)	20 (37.7)
Q18	42 (84)	8 (16)	3 (100)	0 (0)	45 (84.9)	8 (15.1)
Q19	25 (50)	25 (50)	2 (66.7)	1 (33.3)	27 (50.9)	26 (49.1)
Q20	25 (50)	25 (50)	2 (66.7)	1 (33.3)	27 (50.9)	26 (49.1)
Q21	19 (38)	31 (62)	2 (66.7)	1 (33.3)	21 (39.6)	32 (60.4)
Q22	32 (64)	18 (36)	2 (66.7)	1 (33.3)	34 (64.2)	19 (35.8)

Source: data collection, 2019. Note: *Descriptive analysis. Underlined are the categories with more than 75% of the answers given. *Q1: in the last year did you fall?; Q2: in the last year have you tripped?; Q3: can you climb stairs without help?; Q4: did you notice if your walking speed has recently decreased?; Q5: can you cross the street while the light is green?; Q6: can you walk 15 min without stopping?; Q7: can you stand on one foot for about 5 seconds?; Q8: do you use any assistive devices when walking?; Q9: can you wring a towel well?; Q10: do you feel dizzy?; Q11: is your back leaning forward?; Q12: do you have knee pain?; Q13: do you have vision problems?; Q14: Do you have hearing problems?; Q15: do you think you are forgetting?; Q16: are you afraid of falling when walking?; Q17: do you take more than five types of medication?; Q18: do you have difficulty seeing inside your house?; Q19: are there any obstacles inside your house?; Q20: are there any unevennesses in the floor of your house?; Q21: do you use stairs in your daily life?; Q22: do you go uphill on the street? (own translation)

However, even with the change in gait speed, 94.30% (n = 50) of the total answered that they can cross the street while the signal is green, and all individuals with scores below 6.5 did not report difficulty, on the other hand, with 94% (n = 47) of those with a value above.

Thus, 79.20% of individuals answered that they could walk 15 minutes without stopping, according to Q6, and all with a score lower than 6.5 for risk of fall can, compared to 78% of those with scores above this value. Regarding Q8, all individuals with a score below 6.5 said that they did not use any aid device while walking.

From Q9, which questions whether individuals can twist a towel well, it was verified that all respondents with < score 6.5 for risk of fall achieve, with only 32% (n = 16) of those with scores above 6.5. Regarding postural instability, evidenced by Q11, 84.90% (n = 45) of individuals in the sample reported that they observed that the back was more forward-leaning, and 86% (n = 43) scored above 6.5 said they had this change.

Regarding Q13, when it questions about individuals having vision impairment, it was verified that 90.60% (n = 48) of the sample reported having problems, and 92% (n = 46) of individuals with a score ≥ 6.5 for risk of fall reported having decreased visual acuity. Regarding Q15, which questions whether individuals are more forgotten, it was evidenced that 79.20% (n = 42) said yes, and 82% (n = 41) were respondents with scores above 6.5 for risk of fall.

Table 4. Spearman's correlation between the variables severity of Parkinson's disease, age and diagnosis time with the Simple Screening Test for Risk of Falls in the Elderly score (Q22P), 2019 (n = 53).

	Correlation
Hoehn and Yahr Severity Score	0,38 (p = 0,025)
Patient age	0.236 (p = 0.089)
Diagnosis time (years)	0.347 (p = 0.011)

Source: data collection, 2019.

All individuals with a score < 6.5 for risk of falling reported that they are not afraid to fall while walking, as evidenced by Q16. 84.90% (n = 45) of the sample reported that they did not present difficulties to see inside their residence. Among them, 84% (n = 42) of individuals with a score ≤ 6.5 for risk of fall did not present difficulty.

Table 4 demonstrates the relationship between Hoehn and Yahr score, age and diagnosis time with the variable final Q22P score. There was a moderate correlation between the variables Hoehn and Yahr score and Q22P (rS = 0.308; p = 0.025) and diagnosis time in years with Q22P (rS = 0.347; p = 0.011). Thus, we conclude that the relationship of these variables is direct, that is, the higher the severity scores and the diagnosis time of the patient, the greater the risk of fall measured by Q22P.

DISCUSSION

Fall is a relevant factor for people with PD, and its cause is multifactorial.[14] People with this condition have 62% more experiences with falls than individuals with other neurological diseases,[15] which is justified by the lack of coordination of movements, tremors and slowness in activities of daily living caused by the decrease in the production of dopamine in the body.[2]

As the individuals in this research aged 60 to 70 years or over 70 form groups representing 34% (n = 18) in each sample, totaling 68% of the total, it is shown that, with advancing age, there is a greater appearance of non-communicable chronic diseases, such as PD[16] and greater susceptibility to falls.[17] This event was confirmed by the Simple Screening Test for Risk of Falls in the Elderly, Q22P, which identified 94.30% (n = 50) of the sample with a score greater than 6.5, indicating a risk of falls.

Drug interaction is characterized by the change in the effectiveness of one drug as a function of another, which can generate some adverse effects to individuals, such as gastrointestinal changes, kidney dysfunction, heart problems, falls and even fractures.[18] This fact was verified in the research process, in which individuals who took less than five medications had lower fall scores (median = 9.5), when compared with the score of those who responded taking five or more medications (median = 12, 0). Although both groups are at risk for falls, it appears that the more medications, the greater the risk of interactions and unwanted effects between them.

Diagnosis time (DT) or illness duration is also related to risk of falls: the advance of PD increases the motor impairment, which can lead individuals to present gait freezing, which has a prevalence of 21% in the initial stages with about 80% in the more advanced ones, which predisposes to falls.[19] This situation was confirmed by the study, in which individuals with four years of diagnosis or less had lower scores on the Q22P, when compared to the scores of those with more than five years.

Individuals with mild disease severity had lower DT (median of 5.5 years) when compared to those with moderate or severe severity (median of nine years). The literature brings facts that are contrary to this statement, as most articles address DT and disease severity as measured by the HY scale as factors associated with falls, without, however, correlating them.[20,21] In one of the studies, despite having verified the impact of PD duration in fallers, disease progression was not associated.[22] In another article, despite considering the progressive impact of the disease, there was no direct relationship between DT and the most severe stage on the HY scale.[23]

The stumbles reported by 76% (n = 38) of individuals in the research can be explained by bradykinetic gait, characterized by slow movement,[24] evidenced in 90.60% (n = 48) of individuals in the sample. A decrease in gait speed was observed, and 92% (n = 46) with a score above 6.5 for risk of falling reported slowness, which, consequently, leads to a higher risk of falls. Tripping or tripping risk is an important predictor of falls and represents the result of a foot hitting or colliding with a surface, causing loss of balance and, generally, a fall.[24]

Even with the recent diagnosis, individuals with PD tend to have reduced trunk mobility, decreased arm movement and slow movement, characteristic factors of bradykinesia, which, as it progresses, leads to reduced speed and automaticity of gait, decreased step length, foot tripping, reduced anticipatory postural adjustments and risk of falls.[25,26]

Even with this significant change in gait speed and stumbling, 94.30% (n = 50) of individuals responded that they can cross the street while the light is green and 79.20% (n = 42) responded that they can walk for 15 minutes without stopping. This fact is probably justified by the majority of individuals, 71.70% (n = 38), having a mild stage of PD. This is in contrast to the literature, which reports that the fall can be recurrent and occur with the advancement of the stage of the disease, as evidenced by the Hoehn and Yahr scale, from 5% in stage 1 to 60% in stage 4.[21,26]

A total of 90.60% (n = 48) of the sample reported having vision problems, and this fact was evidenced in 92% (n = 42) of individuals with a score > 6.5 for risk of falling on the Q22P. The literature reports that reduction in visual feedback, when approaching an object, demands greater planning from individuals, leading them to higher rates of trips and falls.[27] As a result, risk of falls in individuals with vision problems is justified, due to the increased planning to perform daily activities, in particular, dual task. However, they present as a positive point the issue that 84.90% (n = 45) of individuals reported that they have no difficulties in seeing inside their home, which shows that, even

with reduced visual acuity, they are aware of their limitation, in addition to having good education to better adapt their homes.

Regarding Fear of Falling (FOF), all individuals with a score ≤ 6.5 for risk of falling reported that they are not afraid of falling while walking, as evidenced by Q16, all with mild HY. This shows that FOF, as reported in the literature, among other factors, is related to the severity and progression of PD.[28]

It is expected that the results of this study are disseminated among people with PD, their family members registered in the association and among professionals who work with these individuals, at different levels of health care.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

In order to improve the quality of life of people with PD and their family caregivers, in addition to providing quality care to individuals and family, and noting that there are few studies that address the disease, living with it and the factors of risk that lead to falls, especially in nursing, the importance of studying here risk of falls and PD is justified. The research made it possible to identify in the sample of 53 individuals the risk of imminent falls and to identify some risk factors, such as age, use of more than five medications, DT, stumbling, decreased gait speed and reduced visual acuity.

The population made up mostly of individuals over 60 years of age demonstrates that it requires comprehensive care from professionals and their families and/or caregivers, paying attention to factors of aging and motor involvement of the disease. It also brings as a relevant issue, for the most part, having partners, from which it is inferred that they receive follow-up by the partners. This factor can be worked on by professionals, expanding their view of family members and seeking to constantly integrate them into the care provided.

The findings of this study contribute to nurses' understanding of how the fall event interferes in the lives of people with PD. This understanding can help nurses provide effective interventions for people vulnerable to risk factors for falls and increase their awareness of preventing the event. The study carried out presented as a limitation the sample composed of people with PD, mainly with mild impairment, restricting the generalization of results to contexts with heterogeneous populations in relation to the stage and severity of the disease. It is suggested to expand in the future to populations with larger dimensions and with more variability in relation to the severity of the disease and not just within the scope of APASC.

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AUTHOR'S CONTRIBUTIONS

Study design. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

Data collection or production. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

Data analysis. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

Interpretation of results. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

Article writing and critical review. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

Approval of the final version of the article. Franciny da Silva. Angela Maria Alvarez. Simony Fabíola Lopes Nunes. Maria Eduarda Massari Silva. Silvia Maria Azevedo Dos Santos.

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ASSOCIATED EDITOR

SCIENTIFIC EDITOR

REFERENCES

1. Monteiro D, Silva LP, Sá PO, Oliveira ALR, Coriolano MGWS, Lins OG. Prática mental após fisioterapia mantém a mobilidade funcional de pessoas com doença de Parkinson. Fisioter Pesqui. 2017;25(1):65-73. http://dx.doi.org/10.1590/1809-2950/17192425012018.
2. Albuquerque LCA, Silva HJ, Pernambuco LA, Lima SJH, Cunha DA. Amplitude e velocidade dos movimentos mastigatórios em pacientes com doença de Parkinson. Rev CEFAC. 2017;19(1):69-74. http://dx.doi.org/10.1590/1982-021620171919516.
3. Silva TP, Carvalho CRA. Doença de Parkinson: o tratamento terapêutico ocupacional na perspectiva dos profissionais e dos idosos. Rev Cad Bras Ter Ocup. 2019;27(2):331-44. http://dx.doi.org/10.4322/2526-8910.ctoao1229.
4. Santos JA, Magalhães EMA, Correia IF, França SA, Brito SS, Carvalho CVD et al. Impactos da doença de Parkinson na vida dos idosos. Desafios (Palmas). 2019;6(4):1-11. http://dx.doi.org/10.20873/uftv6-6765.
5. Santos GLA, Santana RF, Broca PV. Execution capacity of instrumental activities of daily living in elderly: Ethnonursing. Esc Anna Nery. 2016;20(3):1-7. http://dx.doi.org/10.5935/1414-8145.20160064.
6. Vilaça CO, Breder R, Ribas MA, Pessoa BL, Orsini M, Dinoá VA et al. Hipotensão ortostática na doença de Parkinson: revisão. Rev Valore (Online). 2019;4(1):824-40. http://dx.doi.org/10.22408/reva412019201824-840.
7. Paixão Jr CM, Heckman MF. Tratado de geriatria e gerontologia. 3ª ed. Rio de Janeiro: Guanabara; 2013.
8. Chou KL, Elm JJ, Wielinski CL, Simon DK, Aminoff MJ, Christine CW et al. Factors associated with falling in early, treated Parkinson's

disease: the NET-PD LS1 cohort. J Neurol Sci. 2017;377:137-43. http://dx.doi.org/10.1016/j.jns.2017.04.011. PMid:28477684.

9. Mari FR, Alves GG, Aerts DRGC, Camara S. The aging process and health: what middle-aged people think of the issue. Rev Bras Geriatr Gerontol. 2016;19(1):35-44. http://dx.doi.org/10.1590/1809-9823.2016.14122.
10. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;12(3):189-98. http://dx.doi.org/10.1016/0022-3956(75)90026-6. PMid:1202204.
11. Tutiya KK, Barros BF, Martuscello JC, Santos FC. Queda em idosos: tradução, adaptação transcultural e validação do teste de rastreio "Q22-p". RBM Rev Bras Med. [Internet]. 2015; [citado 2021 abr 10];72(7):293-8. Disponível em: https://www.researchgate.net/publication/290816811
12. Callegari-Jacques SM. Bioestatística: princípios e aplicações. Porto Alegre: Artmed; 2005.
13. IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.; 2017.
14. Lord S, Galna B, Yarnall AJ, Coleman S, Burn D, Rochester L. Predicting first fall in newly diagnosed Parkinson's disease: Insights from a fall?naïve cohort. Mov Disord. 2016;31(12):1829-36. http://dx.doi.org/10.1002/mds.26742. PMid:27621153.
15. Barbosa AF, Chen J, Freitag F, Valente D, Souza CO, Voos MC et al. Gait, posture and cognition in Parkinson's disease. Dement Neuropsychol. 2016;10(4):280-6. http://dx.doi.org/10.1590/s1980-5764-2016dn1004005. PMid:29213470.
16. Malta DC, Bernal RTI, Lima MG, Araújo SSC, Silva MMA, Freitas MIF et al. Noncommunicable diseases and the use of health services: analysis of the National Health Survey in Brazil. Rev Saude Publica. 2017;51(Suppl 1):4s. http://dx.doi.org/10.1590/s1518-8787.2017051000090. PMid:28591353.
17. Nascimento JS, Tavares DMS. Prevalence and factors associated with falls in the elderly. Texto Contexto Enferm. 2016;25(2):1-9. http://dx.doi.org/10.1590/0104-07072016000360015.
18. Cavalcante MLS, Alcântara RKL, Oliveira ICL, Aires SF, Girão AALA, Carvalho REFL. Segurança medicamentosa em idosos institucionalizados: potenciais interações. Esc Anna Nery. 2020;24(1):1-8. http://dx.doi.org/10.1590/2177-9465-EAN-2019-0042.
19. Paz TSR, Silva AEL, Martins NIM, Brito VLS, Leite MAA, Correa CL. Congelamento da marcha e de membros superiores na doença de Parkinson. Rev Bras Neurol. [Internet]. 2019; [citado 2021 abr 10];55(2):11-6. Disponível em: https://www.researchgate.net/publication/334519740
20. Allen NE, Schwarzel AK, Canning CG. Recurrent falls in Parkinson's Disease: a systematic review. Parkinsons Dis. 2013;906274. http://dx.doi.org/10.1155/2013/906274. PMid:23533953.
21. Almeida,LRS, Valença GT, Negreiros NN, Pinto EB, Oliveira-Filho J. Recurrent falls in people with Parkinson's Disease without cognitive impairment: focusing on modifiable risk factors. Parkinsons Dis. 2014:432924. https://doi.org/10.1155/2014/432924.
22. Farombi TH, Owolabi MO, Ogunniyi A. Falls and their associated risks in Parkinson's disease patients in Nigeria. J Mov Disord. 2016;9(3):160-5. http://dx.doi.org/10.14802/jmd.16011. PMid:27667188.
23. Pereira MT, Oliveira DMS, Dias ACAM, Moraes AMF, Dias GAS, Oliveira EM. Correlação entre o equilíbrio funcional e o estadiamento da Doença de Parkinson. Para Res Med J. 2017;1(3):1-8. http://dx.doi.org/10.4322/prmj.2017.030.
24. Park JH, Kang YJ, Horak FB. What is wrong with balance in Parkinson's disease? J Mov Disord. 2015;8(3):109-14. http://dx.doi.org/10.14802/jmd.15018. PMid:26413237.
25. Schoneburg B, Mancini M, Horak F, Nutt JG. Framework for understanding balance dysfunction in Parkinson's disease. J Mov Disord. 2013;28(11):1474. http://dx.doi.org/10.1002/mds.25613. PMid:23925954.
26. Rascol O, Perez-Lloret S, Damier P, Delval A, Derkinderen P, Destée A et al. Falls in ambulatory non-demented patients with Parkinson's disease. J Neural Transm (Vienna). 2015;122(10):1447-55. http://dx.doi.org/10.1007/s00702-015-1396-2. PMid:25845678.
27. Faria FP, Martens KAE, Silveira CRA, Jones JA, Almeida Q. Interações entre carga cognitiva e sensorial durante o planejamento e controle de adaptações de marcha complexas na doença de Parkinson. BMC Neurol. 2014;250(14):1-12. http://dx.doi.org/10.1186/s12883-014-0250-8.
28. Haertner L, Elshehabi M, Zaunbrecher L, Pham MH, Maetzler C, Uem JMTV et al. Effect of fear of falling on turning performance in Parkinson's disease in the lab and at home. Front Aging Neurosci. 2018;10:1-8. http://dx.doi.org/10.3389/fnagi.2018.00078.

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