

Perception of self-efficacy in active elderly people with Parkinson's disease**Percepção de autoeficácia em idosos ativos com doença de Parkinson**

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ABSTRACT

The aim of the research was to analyze the perception of self-efficacy in elderly patients with Parkinson's disease (PD) who participate in a strength exercise program. It was a transversal study with exploratory and quantitative aspects. The sample consisted of 37 elderly male volunteers diagnosed with PD. Were used Scale of Hoehn and Yahr to analyze the clinical evolution of PD, Perceived General Self-Efficacy Scale for the analysis of the perception of self-efficacy, Mini Mental State Examination for verification of cognitive abilities. Classification was performed in low and high self-efficacy, being 56.8% of subjects classified with high self-efficacy and 43.2% with low self-efficacy. No significance level was found between the correlation of auto-efficacy with the stage of Parkinson's disease, the time of diagnosis, or cognitive ability. There was agreement with results obtained in studies that relate resistance exercises and Parkinson's disease. Results found in the present study for high self-efficacy indicated that people with diseases with deleterious characteristics like PD, practicing resistance exercise, have better condition of coping with the inherent limitations of the disease. Therefore, it was concluded that the subjects participating in the resistance exercise program had high perception of self-efficacy.

Keywords: Exercise Therapy, Strength Exercise, Time with PD.

RESUMO

Objetivou-se analisar a percepção de autoeficácia em idosos portadores da Doença de Parkinson (DP) que participam de um programa de exercício de força. Tratou-se de um estudo transversal com características exploratória e quantitativa. A amostra foi composta por 37 voluntários idosos do sexo masculino com diagnóstico de DP. Foram utilizados: Escala de Hoehn e Yahr para analisar a evolução clínica da DP, Escala de Autoeficácia Geral Percebida para análise da percepção de autoeficácia, Mini Exame de Estado Mental para verificação das habilidades cognitivas. Foi realizada a classificação em baixa e alta autoeficácia, sendo 56,8% dos sujeitos classificados com alta autoeficácia e 43,2% com baixa autoeficácia. Não foi encontrado nível de significância entre a correlação da autoeficácia com o estágio da doença de Parkinson, o tempo de diagnóstico ou a habilidade cognitiva. Houve concordância com resultados obtidos em trabalhos que relacionam exercícios resistidos e doença de parkinson. O resultado encontrado no presente estudo para alta autoeficácia apontou que pessoas com doenças com características deletérias como DP, praticantes de exercício resistido, possuem melhor condição de enfrentamento das limitações inerentes à doença. Portanto, concluiu-se que os sujeitos participantes do programa de exercícios resistidos possuíram alta percepção de autoeficácia.

Palavras-chave: Terapia por Exercício, Exercícios de Força, Tempo com DP.

1 INTRODUCTION

Aging is an inevitable phenomenon, inherent to the human being, with changes in biological, physical, social and psychological aspects of the individual (Maireles, Pereira, Oliveira, Christofolletti & Fonseca, 2010). With the progression of the chronological age, biological and physical functions are reduced, with loss of muscle mass and bone tissue (Guedes, Santos, Lopes & Correa, 2006), which can cause significant functional deficit. In the psychological domains, such loss does not present itself with the same intensity, since the individual can positively develop affective, social and intellectual dimensions (Figueiredo, Lima & Guerra, 2003).

The psychological improvement is more noticeable in the elderly who present a healthier and more active life (Irigaray & Schneider, 2009). Successfully aging is a combination of low probability of disease and related morbidities, maintenance or reinforcement of physical and cognitive functions, and full engagement in life, including productive activities and interpersonal relationships, so that resilience, self-efficacy and wisdom should be considered (Carter, Kannus & Khan, 2001).

Beliefs of self-efficacy can become stronger as successful experiences are experienced, reinforcing positive attitudes and encouraging the elderly to overcome difficulties inherent in the aging process (Bandura, 1977). The elderly have difficulty evaluating their own abilities affected by loss of biological functions, which decline according to age or due to diseases associated (e.g Parkinson's disease) with old age; thus, the elderly have their sense of self-efficacy particularly challenged (Neri, 2007).

In studies with patients with chronic diseases, individuals who had better self-efficacy scores showed improvement in treatment adherence and were also more active even with disease limitations (Bandura, 2004; Berry & West, 1993).

PD is a progressive, chronic and degenerative condition of the central nervous system, characterized by deficiency in dopamine production caused by destruction of the substantia nigra by the brain (Karinkanta, Heinonen, Sievanen, Uusi-Rasi & Kannus, 2005). The main symptoms of the disease are: slowness of movements characterized as bradykinesia, muscle stiffness, tremors, balance disturbances and progressive decrease of motor functions (Durmus et al., 2010). When combined with additional factors, such as decreased muscle strength, those can lead to falls causing fractures, joint dislocations and severe soft tissue injuries (Cano-de-la-Cuerda, Perez-de-Heredia, Miangolarra- Page, Muñoz- Fernández-de-Las-Peñas, 2010).

In addition, it is referenced in literature that engagement in exercise and physical activity mitigates the progression of disability and increases quality of life in people with Parkinson disease

(Colón-Semenza et al., 2018) and improve the human performance (Foster et al., 2017). The involvement in strength exercise has been identified as a preventive and therapeutic alternative to minimize motor and non-motor symptoms (Speelman et al., 2011; Reuter, Harder, Engelhardt & Baas, 2000; Lau, Patki, Das-Panja, Le & Ahmad, 2011; Oliveira-Silva et al., 2017), but it has a poor evidence about the perception of self-efficacy in elderly people with Parkinson's disease. Thus, the aim of the present study was to analyze the perception of self-efficacy in elderly people with Parkinson's disease who participate in a resistance exercise program.

2 METHOD

It was a transversal research of single collection with exploratory and quantitative character. The morphophysiological characteristics of elderly male volunteers diagnosed with PD and the perception of each subject on their self - efficacy were analyzed.

Sample

The sample of the present study was composed by 37 male subjects with a mean age of 64.27 \pm 9.36 yrs, practicing exercise for 6 months at the Physical Activity Program for People with Neurodegenerative Diseases of the Faculty of Physical Education of the University of Brasília (FEFI - UnB), with a diagnosis of PD issued by a neurologist.

The inclusion criteria were: being male; have a diagnosis of PD; age between 60 and 80 years old; score equal to or greater than 24 points in the Mini Mental State Examination (MMSE); have ranged from 1 to 3 on the Hoehn and Yahr Modified Scale (2004); be practicing specific exercise program for 6 months and have accepted to participate in the research signing the Term of Free and Informed Consent for scientific work.

Instruments

In order to collect the data, the selected individuals were submitted to the Scale of Hoehn and Yahr Modified by the Movement Disorder Society (2004) (HY), according to the recommendations proposed by Brucki, Nitrini, Caramelli, Bertolucci and Okamoto (2003) and to the anthropometric evaluation - stature, body mass and body mass index (BMI). In addition, the muscle strength was verified by means of the test of 10 maximum repetitions (MR) as proposed by Baechle and Earle (2000). For this, 8 familiarization sessions were performed to guarantee the validity of the test, as suggested by Ploutz-Snyder and Giams (2001).

Self-efficacy was measured using the General Perceptual Self-Efficacy Scale (EAEGP), by Schwarzer and Jerusalem (1995). The Brazilian scale was adapted based on the English, Spanish and Portuguese versions of the same instrument. For the validation of the scale, the internal consistency analysis was used using Cronbach's Alpha, which presented an index of 0.81, showing the suitability of the scale in Brazilian version. Aiming to evaluate the external validity of the scale, a series of correlation studies with other validated scales such as anomia, satisfaction with social and gender support (Sbicigo, Teixeira, Dias & Dell'Aglio, 2012)

The resistance training program was outlined in accordance with the recommendations of the American College of Sports Medicine (ACSM, 2009) in its pronouncements on exercise for the elderly and for individuals with PD. All exercises were performed on specific machines for resistance training of the Rotech model RS brand (Goiânia, Brazil). The intervention had a total duration of twelve sessions, with a frequency of two sessions per week, totaling six weeks of training.

The sessions were preceded by a warm-up period composed by the following movements: trunk flexion in dorsal decubitus, standing trunk extension and standing ankle extension. Two sets of up to one minute each were performed, with one minute intervals, at free speed. If necessary, volunteers could stop the series before the target time.

Each session was composed by the following exercises: knee extension movements associated with hip extension (leg press exercise), horizontal shoulder flexion associated with elbow extension (sitting bench press exercise), knee flexion (flexor chair exercise), extension of the shoulder associated with elbow flexion (sitting rowing exercise) and knee extension (extension chair exercise). Volunteers performed two sets of 12 to 15 repetitions of each movement, with intervals of 90 seconds and free speed. The load corresponded to number four of the OMNI-Resistance Exercise Scale proposed by Lagally and Robertson (2006), which refers to a subjective perception of effort classified as "not easy". The load progression was performed whenever the individual was able to perform more than 15 repetitions in both sets of exercise. These sessions were designated as familiarization phase, and aimed to promote the necessary adaptations for the application of a strength test (10 RM test). According to Ploutz-Snyder and Giams (2001), in the elderly, this process occurs in eight sessions.

Procedures

The present work was submitted to the Ethics and Research Committee (CEP) of the Brasil Platform and the Catholic University of Brasilia (UCB), following all the recommendations of

Resolution 466/2012 and its complementary ones, which deals with research involving human beings. The citizens involved in the research were guaranteed all the rights cited in the term of free and informed consent, which was signed by them.

The assessments of cognitive ability, Perceived General Self-Efficacy Scale, Hoehn scale and modified Yahr scale were performed in a single day previously scheduled with the participants of the research, in a reserved room on the campus of the University of Brasilia (UnB), Faculty of Physical Education (FEFI). The tests were individually answered with the aid of a duly trained evaluator to perform each test - the evaluator read the questionnaire and assisted the assessor when necessary.

Statistic analysis

An exploratory analysis of the data was performed, with descriptive measures of mean and standard deviation to organize and present the results. To characterize the sample, the following variables were used: body mass, stature, BMI, stage of Parkinson's disease (Hoehr-Yarh), time of diagnosis (in years), cognitive ability (MMSE) and self-efficacy score (EAEGP). To evaluate the reliability of the questionnaire used to measure self-efficacy (EAEGP), the Cronbach's alpha coefficient was used, an adequate statistic to measure the internal consistency of the instrument, considering the lower limit of acceptability as 0.70. The interquartile distribution of EAEGP was presented and the median was used as the cut-off point for self-efficacy: low or high. Spearman's non-parametric correlation coefficient (r) was used to evaluate the relationship between self-efficacy and other study variables: stage of Parkinson's disease (Hoehr-Yarh), time of diagnosis (in years) and cognitive ability (MMSE). All analyzes were performed in the SPSS 17.0 program, adopting the level of significance of $p \leq 0.05$.

3 RESULTS

The descriptive characteristics of the 37 elderly men with PD participating in the study were analyzed using the t test, the age of the population being 64.27 ± 9.36 years (Min-Max), the body mass was 72.46 ± 12.40 kg (Min-Max), the height was 166.54 ± 6.25 cm (Min-Max) and the BMI 26.28 ± 4.34 kg/m² (Min-Max).

Regarding the clinical characteristics of the group, in the evaluation of the severity of the disease by the Hoehn and Yahr scale, the mean was $2.41 (\pm 0.94)$ (Min-Max). For the diagnostic time the value was $8.43 (\pm 5.62)$ years (Min-Max) and for the EAEGP the mean was $32.57 (\pm 5.95)$

(Min-Max). Analyzing the MMSE, the value of 26.78 (\pm 2.63) (Min-Max) was identified, thus qualifying all individuals to participate in the study.

The EAEGP questionnaire applied in the present study presented Cronbach's alpha statistic of 0.91, which demonstrated good instrument reliability, since the lower acceptability limit is 0.70.

For the classification of self-efficacy at high or low levels, the interquartile distribution of EAEGP was presented (Table 1) and the median was used as the cut-off point for self-efficacy. Therefore, individuals with scores up to 33 points were classified as low self-efficacy and individuals with a score of 34 points or higher were classified as having high self-efficacy.

Table 1. Interquartile distribution of EAEGP

Percentile	EAEGP
P25	29.5
P50 (Md)	34.0
P75	37.0

EAEGP = Perceived General Self-Efficacy Scale; P25 = percentile 25; P50 = percentile 50; Md = median; P75 = percentile 75.

Source: the authors

According to this analysis, two groups were identified, in which 21 participants (56.8%) were classified with high self-efficacy perception and 16 (43.2%) were classified with low self-efficacy perception.

Table 2 shows that there was no level of significance between the correlation of self-efficacy (EAEGP) with the stage of Parkinson's disease (Hoehn and Yahr), time of diagnosis (in years) and cognitive ability (MMSE) using the Rho of Spearman.

Table 2 - Self-efficacy correlation (EAEGP) with stage of Parkinson's disease (Hoehn and Yahr), time of diagnosis (in years) and cognitive ability (MMSE).

	r	p
Hoehn e Yahr	-0.069	0.685
Diagnosis (years)	0.031	0.857
MEEM	0.211	0.210

MEEM = Mini Mental State Examination; EAEGP = Perceived General Self-Efficacy Scale; n = sample number; r = correlation coefficient; p = level of significance.

Source: the authors

Table 3 shows the quantitative description of high self-efficacy and low self-efficacy, according to EAEGP, and the time of diagnosis.

Table 3. Description of high self-efficacy and low self-efficacy according to the average time of diagnosis (in years):

	Time since diagnosis (years)	Number of subjects
High self-efficacy	< 8	10
	≥ 8	11
Low self-efficacy	< 8	9
	≥ 8	7

Source: the authors

4 DISCUSSION

Considering the references research carried out for the present study, there was agreement with the results obtained in studies that relate resistance exercises and Parkinson's disease.

According to Mak and Wong-Yu (2019), muscle weakness is present in PD patients and progressive resistance exercises are effective to improve muscle strength, moreover sustained strength training could slow down disease progression.

Also, it was reported that high exercisers with PD were more likely to engage in multi-modal exercise regimens and believed in the impact of exercise on their motor symptoms, mood, and sleep; low-exercisers needed more motivation to overcome perceived barriers including having no one to exercise with, fatigue, and depression (Afshari, Yang, & Bega, 2017).

It is important to emphasize that the participants of the research were able to participate in the intervention of the assessment of the severity of PD obtained through the Hoehn and Yahr scale, according to other researches (Antonini, Moeller, Nakamura, Spetsieris, Dhawan and Eidelberg, 1998, Aspergillus et al., 2008), since patients with levels above grade three present great difficulty in locomotion, advanced bradykinesia and other symptoms, according to studies associated with the use of resistance exercises and physical activity (Carter et al., 1992, Buckley, Pitsikoulis & Hass 2008, Cano-de-la-Cuerda et al., 2010), which would make it impossible to practice safely the proposed training.

By analyzing the subjects' cognitive level by the MMSE, the mean of 26.78 (\pm 2.63) was found, which is fundamental to allow the participation of the respondents, seeking the understanding and adequate response of the research instruments, such as the EAEGP scale and severity of PD. In their study, Mahieux, Michelet, Manificier, Boller, Fermanian & Guillard (1995) demonstrated that the MEEM is totally reliable to verify the cognitive level of individuals with PD. Also Brucki et al. (2003) reported that the applicability of this instrument proved to be good for hospital, outpatient, and population-based settings.

According to Couto (2010), self-evaluation of functional abilities and difficulties in maintaining or accepting rehabilitative resources depends on criteria such as self-esteem and self-efficacy, which can be observed in this study. With the methodology employed, the research demonstrated the presence of a good perception of self-efficacy by the majority of the elderly with Parkinson's who joined the resistance exercise program.

By relating the sense of self-efficacy to the time of diagnosis of the disease and the level of physical impairment, no significant level of significance was found. However, it was verified that the participants with a score of 34 points or more were classified as having high self-efficacy, which suggests that the resistance exercises favor a positive modulation in these subjects for self-efficacy, similar to the work of Miranda and Godeli (2003), in which the subjects that practice physical activity had their scores in the EAEGP like to those found in the present study.

When correlating the time of diagnosis and classification in the EAEGP, it was observed that 11 subjects with a time greater than or equal to 8 years of diagnosis obtained scores to be classified in the high self-efficacy group, which may mean perception of good quality of life in the elderly, even with Parkinson's. However, 7 subjects with similar time of diagnosis presented scores below 34, being classified with low self-efficacy, which can be justified by individual personal variations. As for the participants with less than 8 years of diagnosis, 10 of them had high self-efficacy and 9 subjects had scores below 34 in the PGFGP, which highlights the individual nuance of the clinical condition and the perception of functional capacity.

Hirayama et al. (2004) reported that PD patients who were regularly instructed in physical activity were more willing and motivated to deal with the difficulties resulting from the symptoms presented by the disease. This was also found in other studies (Aguar et al., 2009, Fontes & Azzi, 2012, Bertoldi, Silva & Faganello-Navega, 2013), similar to what most participants in the present study reported, since acquired self-efficacy with guided resistance exercises allowed them to recognize their personal resources in managing limitations inherent to the disease, especially self-confidence.

The results found in the present study for high self-efficacy indicated that people with diseases with deleterious characteristics such as Parkinson's, who practice resisted exercise, have a better condition for coping with the inherent limitations of the disease, similar to Silva and Lautert (2010) reports that the adoption of health promoting behaviors, such as practicing physical activity regularly, among others, contributes to avoid the development of diseases associated with non-adoption of these behaviors.

By Fontes and Azzi (2012) and Bandura (2001), although old age is associated with loss of physical and cognitive capacity, there are some compensations and gains: the capacity for self-regulation remains unchanged throughout life through protective factors of aging, which means that certain areas and mechanisms of the self (self-definition, as a person, the meaning of their identity) can act as resources for self-efficacy and growth, optimizing the functioning of health.

Often practicing physical activity is beneficial to health; therefore, special groups such as diabetics and hypertensives should adhere to this strategy as non-drug treatment, in order to improve the results and reduce the symptoms of diseases (World Health Organization, 2003; Silva, Gonçalves, Magdalon, de Paiva & Liberali 2011; da Silveira et al., 2011), which can also be adopted as part of non-drug treatment for patients with Parkinson's disease.

The studies of Bertoldi et al. (2013) and Au-Yeung, Ng and Lo (2003) have reported directly proportional correlations between balance changes and decreased muscle strength in people with Parkinson's, which can be reduced by practicing resistance exercises on a regular basis. According to Shepherd (2001), the muscular strengthening exercises act in the increase of the recruitment of motor units, in the improvement of the corporal balance, in the capacity and the timing in the generation of force, they diminish the muscular rigidity and the reflex hyperactivation and they preserve the extensibility function of muscles. Bertoldi et al. (2013) pointed out that the improvements resulting from the practice of resistance exercises are not limited to the psychological and behavioral changes, since balance, strength and muscular endurance are also stimulated factors, contributing directly to a functional improvement of the subject.

Rodrigues-de-Paula, Lima, Teixeira-Salmela and Cardoso (2011) reported that the gain of muscular strength through an adequate resistance training program is effective in conditioning and maintaining balance, in addition to avoiding falls, which are frequent in individuals with DP. Studies have shown that people with Parkinson's practicing resistance exercises on a regular basis improves their motor function, which boosts the perception of self-efficacy, as verified in the present work's results (Shepherd 2001; Au-Yeung et al. Bertoldi et al., 2013).

In the review presented by Lauzé et al. (2016), in despite of psychosocial aspects of life show the least potential for improvement as a result of a physical activity intervention, health management (including assessment by Stanford self-efficacy) was more positively influenced by exercise than quality of life.

According to Miranda and Godeli (2003), participation in physical activity is related to satisfaction with life due to increased self-efficacy and competence; improvement in self-concept, self-esteem and body image; quality of life. In addition, the physically active elderly presented better

health and reported increased ability to cope with stress and tension on a daily basis, factors that influence the perception of the level of satisfaction with life itself, which can be applied to the elderly with PD, according to the results of the present study.

Stevens, Staton, and Rebar (2019) highlight that it is recommended that exercise specialists keep some principles in mind when working with people with PD, such as facilitate increased self-efficacy, autonomy and competence by emphasizing the person's growing skills, independent achievements and ability to overcome barriers to exercise, rather than their compliance with the exercise program.

Also, despite limited evidence on interventions in this field, the findings of the study conducted by Rosqvist et al. (2016) suggest that in order to maintain or improve life satisfaction, depressive symptoms and general self-efficacy should be prioritized in the clinical management of PD.

5 CONCLUSION

It was possible to infer by the results of the present study that the participants obtained the necessary score to guarantee the safe practice of the exercises proposed in the program, according to the evaluation of the level of severity of PD verified by the HY scale.

Besides, it was possible to verify through the MEEM that the patients were able to respond to the cognitive aspect to answer the instruments used in this study.

Although no significant correlation was found between the sense of self-efficacy with the time of diagnosis and the level of disease involvement, most elderly people with Parkinson's who participated in the resistance exercise program demonstrated a good perception of self-efficacy, which provides them conditions for coping with the disease.

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