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Parkinson's disease - psychological determinants of quality of life

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Differences in quality of life by personality traits among delayers and non-delayers with Parkinson's disease

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(submitted)

Abstract

Objectives: The aim of the paper is to explore whether quality of life (QoL) in patients with Parkinson's disease (PD) who delayed in seeking help is associated with personality traits.

Methods: The sample consisted of 142 patients (average age 67.6 ± 9.2 years; 51.4% men; mean disease duration 7.6 ± 5.9 years). Patient's delay was dichotomized at the cut-off point of 1 year. The Eysenck Personality Questionnaire (EPQR-A) was used for measuring extroversion (E) and neuroticism (N). Health-related quality of life (HRQOL) was assessed using the Thirty-six Item Short Form Health Survey (SF-36) and its two summary scores: the physical health component summary score (PHC) and the mental health component summary score (MHC). T-tests and multiple linear regression analyses were used to analyze the data.

Results: Increased neuroticism was related to lower scores in PHC and MHC in delayers and in non-delayers. Conversely, non-delayers scored higher in extroversion, which was associated with better scores in PHC and MHC.

Conclusion: Social interactions, associated with an extroverted personality, can force decision making on help-seeking. Factors contributing to early help-seeking behavior in PD patients may result in a greater chance of limiting impairment of their quality of life.

Introduction

Parkinson's disease (PD) is a chronic progressive neurodegenerative disorder influencing many aspects of a patient's life, primarily in terms of mobility and independence. The diversity of symptoms associated with PD (e.g. tremor, rigidity, bradykinesia, falls, as well as non-motor symptoms like painful spasms, depression, sleep problems and fatigue) leads to worse physical, mental and social well-being in comparison with people of the same age without symptoms of Parkinsonism, even when the disease is treated properly [1-3].

In the case of life-threatening diseases like stroke, heart attack or cancer, seeking medical care sooner has a positive impact on the success of treatment [4-6]. The consequence of delay in seeking help for these diseases on a patient's quality of life (QoL) is evident [7,8]. However, there is a lack of literature answering the question of whether delay in seeking help and treatment is associated with later QoL in chronic diseases such as Parkinson's disease. In PD a patient's QoL corresponds with the decision regarding when to start with drug treatment, whether the decision to take a "wait and see" approach or to start with drug treatment immediately

upon identifying the diagnosis might make a difference for improving the patient's self-reported QoL [9]. In patients with PD, health-related quality of life (HRQOL) is determined mainly by physical mobility and progression of the disease [10]. However, quality of life in the elderly can be influenced also by non-clinical factors, for example life satisfaction or happiness [11,12].

The association between patients' delay and personality traits has still not been adequately explained. Many studies on the non-clinical factors of patients' delay have focused mostly on the social, cognitive and emotional factors of delay in life threatening diseases, but studies into the association between personality traits and patients' delay are missing.

The aim of this paper is to explore 1) the relationship between delay and quality of life in patients with PD; 2) the association of personality traits and quality of life in patients with PD, stratified by delay.

Methods

Subjects and procedure

The patients for this cross-sectional study were recruited from the databases of 4 hospitals and 17 outpatient neurologists in the eastern part of the Slovak Republic between February 2004 and February 2006. Neurologists from the mentioned institutions diagnosed all patients included in the sample as suffering from Parkinson's disease according to the United Kingdom Parkinson's Disease Society Brain Clinical Criteria [13].

Exclusion criteria were defined as follows: a) patients older than 85 years because of the high probability of other co-morbidities and movement disabilities of a non-parkinsonian character, and b) patients with a Mini-Mental State Examination (MMSE) score [14] below 23 points.

Each patient was assessed individually by a neurologist from the research team (E.H.) using the Unified Parkinson's Disease Rating Scale (UPDRS Version 3.0) [15]. A patient's cognitive status was assessed using the MMSE [14]. The structured interview consisted of questions on the patient's medical history and subjective feelings that were not part of the questionnaire. Sociodemographic data were derived from questionnaires filled in by the patients themselves and data about antiparkinsonian therapy from their medical records.

The study was conducted after informed consent was obtained from the patients prior to the interview. Participation in the research was voluntary. The local Ethics Committee of the University Hospital in Kosice approved the study in Kosice on 17 December 2002.

Measures

Patient's delay

The length of patient's delay was assessed according to two questions: 'When did the first signs of the disease appear?' and 'How long did you delay the first consultation with your general practitioner (GP)?' The answer to the latter question was recorded as the number of months. Patients were also asked for the approximate date of verification of PD diagnosis: 'When was the diagnosis of PD confirmed?' In cases of uncertainty, the medical records were checked for information regarding the first consultation of a health professional. Because of the intermittent occurrence and slow progress of symptoms in the first phase of the disease, in several cases patients who sought medical help within 1 year of the appearance of the first signs and symptoms of the disease were marked as 'non-delayers' and those over 1 year as 'delayers'. This period was defined on the basis of interviews with patients – when the initial signs were not dramatic, people attributed them frequently to 'stress'. When delaying more than 1 year after the first signs appeared, the delay becomes more serious: Patients cannot attribute these signs to any cause other than disease and should have visited a physician.

Disease severity

The Unified Parkinson's Disease Rating Scale (UPDRS) was used in research for assessing disease severity in patients with PD. The UPDRS consists of four parts, pertaining to: mentation and mood (Part 1), activities of daily living (Part 2), motor function (Part 3) and complications of dopaminergic therapy (Part 4), including motor fluctuations and dyskinesias. Parts 1, 2, and 4 are interview-based; Part 3 is based on a clinical examination by a health care professional and represents the patient's condition at the time of the examination. A neurologist can score patients from 0 to 176, where higher scores indicate increased disease severity [15].

SF-36

The thirty-six item Short Form Health Survey (SF-36) was designed to measure health-related quality of life (HRQOL) from the patient's point of view as part of the Medical Outcome Study (MOS). It assesses 8 health concepts: a) physical functioning; b) role limitations because of physical health problems; c) bodily pain; d) general health perception; e) vitality (energy/fatigue); f) social functioning; g) role limitations because of emotional problems; and h) general mental health [16]. These scales were further combined into 2 summary scores: a physical health component summary score (PHC) (subscales a-d) and a mental health component

summary score (MHC) (subscales e-h). All item scores are transformed into a scale from 0 (poor health) to 100 (optimal health) [17]. Cronbach's alphas for the subscales were .94 for physical functioning, .84 for role limitations because of physical health problems, .91 for bodily pain, .69 for general health perception, .71 for vitality (energy/fatigue), .74 for social functioning, .81 for role limitations because of emotional problems and .75 for general mental health. Cronbach's alphas for the summary scores were .87 for PHC and .78 for MHC.

Extroversion and neuroticism

The Eysenck Personality Questionnaire Revised Abbreviated was used for measuring Extroversion and Neuroticism (EPQR-A) [18]. The questionnaire was validated in the Czech Republic in a sample of 3565 people [19]. The Slovak and Czech languages are very similar. The questionnaire consists of 24 items divided into 4 subscales: extroversion, neuroticism, psychoticism and the lie scale, from which we used extroversion and neuroticism. Items are scored on a Yes (=1) / No (=0) basis, and the overall score for each subscale ranges between 0–6. Higher scores indicate higher levels of the personality traits. Internal reliability found across the samples was .74-.84 for the subscales of extroversion and .70-.77 for neuroticism [20]. In the present study Cronbach's alpha was .85 for extroversion and .72 for neuroticism.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS 14.0.1.) software was used to analyze the data. Summary scores MHC and PHC of SF-36 as well as the UPDRS score were calculated according the scoring algorithm [15,17]. Independent samples were subjected to t-tests to assess the differences between delayers and non-delayers in terms of disease severity, disease duration, age, MHC and PHC. CIA software was used to test the difference of proportions for assessing differences between tested groups in partnership and education [21]. Multiple linear regression analyses were used to assess the contribution of the independent variables – disease severity (UPDRS), age at the time of diagnosis, and extroversion and neuroticism – to the explained variance of the dependent variables – MHC and PHC – in 2 groups of patients: those who sought help within 1 year of the first signs and symptoms appearing and those who delayed more than 1 year before seeking medical care.

Results

Descriptive statistic

Out of 512 patients with Parkinson's disease, 160 agreed to participate and completed the questionnaires. Among the non-participants, 41

patients refused to participate and 311 did not respond to the invitation. Seven patients were excluded after the personal interview because of the exclusion criteria, and 11 questionnaires could not be analyzed because of missing data. Non-participants differed significantly from the analyzed group regarding age (mean difference 1.69 yrs., SE=.87; $t=-1.95$; 95% CI .010 – -3.39) and there were significantly more women than men among the non-participants (difference -0.0110; SE=.041; 95% CI -.091 – .069).

The final sample consisted of 142 patients (51.4% men, 48.6% women) with a mean disease duration of 7.6 years (SD=5.9). Ninety-six patients from the sample (67.6%) lived with a partner, and 46 patients (32.4%) were widowed, divorced or single. Gender differences appeared in patient's delay; women registered the first signs of the disease significantly later and more than half of delayers were women. Otherwise there were no significant differences in age, disease duration and functional status (measured by UPDRS) between men and women. Delayers and non-delayers significantly differed in marital status (70.9% of the non-delayers lived with a partner), in disease severity (non-delayers had worse scores on the UPDRS) and non-delayers perceived their health status as worse.

Delayers and non-delayers differed regarding age achieved as of the date of data collection, but there were no differences in their age at the time of providing the diagnosis. In non-delayers there were more patients with an elementary education and in delayers there were more patients with secondary education. The samples did not differ in the number of patients with a university education. Patients who delayed longer had significantly shorter disease duration ($p\leq 0.001$) and achieved significantly lower scores on the UPDRS ($p\leq 0.001$) than non-delayers. In MHC there were no differences between the two groups, but in PHC the delayers scored higher ($p\leq 0.05$).

All patients used antiparkinsonian therapy according international guidelines [22, 23]. Twelve percent used only L-dopa, and 24% used only dopamine agonists. L-dopa in combination with Catechol-O-Methyl-Transferase (COMT) inhibitors were used by 25.3% of the patients and L-dopa with dopamine agonists were used by 20% of the patients. The combination of L-dopa, a COMT inhibitor and dopamine agonists was used by 16% of the patients from our sample.

Physical and mental quality of life in delayers and non-delayers

Results of the linear regression are displayed in Table 5.2 In delayers and in non-delayers high scores on the UPDRS and neuroticism were associated with low scores in PHC and MHC.

Table 5.1 Characteristics of the sample by length of delay – means and standard deviations (SD) or N (%) on demographic and study variables

		delay < 1 year (non- delayers)	delay > 1 year (delayers)	Total sample	p / 95% CI
Number of subjects (%)		79 (55.6)	63 (44.4)	142 (100)	
Gender	Males (%)	47 (59.5)	26 (41.3)	73 (51.4)	
	Females (%)	32 (40.5)	37 (58.7)	69 (48.6)	
Mean age in years (SD)		69.4 (8.6)	65.4 (9.6)	67.6 (9.2)	p≤0.01
Mean age at onset signs (SD)		62.5 (11.0)	59.9 (10.7)	61.3 (10.9)	ns [#]
Married or living with a partner (%)		56 (70.9)	40 (63.5)	96 (67.6)	-.08; .23 ns ^α
Education	elementary (%)	32 (40.5)	15 (23.8)	47 (33.1)	.02; .32 ^α
	secondary (%)	35 (44.3)	44 (69.8)	79 (55.6)	-.41; -.10 ^α
	university (%)	12 (15.2)	4 (6.3)	16 (11.3)	-.01; .12 ns ^α
Disease duration (SD)		9.2 (6.4)	5.6 (4.3)	7.6 (5.9)	p≤0.001
UPDRS (SD)		43.1 (21.3)	29.1(15.8)	36.9 (20.2)	p≤0.001
Personality	Neuroticism (SD)	2.2 (1.9)	2.7 (1.9)	2.4 (1.9)	ns [#]
	Extroversion (SD)	2.6 (2.3)	2.9 (2.2)	2.7 (2.2)	ns [#]
Mental health summary score (SD)		48.7 (16.0)	53.6 (18.8)	50.9 (17.4)	ns [#]
Physical health summary score (SD)		33.6 (18.0)	42.5 (25.5)	37.6 (22.0)	p≤0.05

Abbreviations: SD – standard deviation, ns - not significant; # t-tests; difference of proportion test

In non-delayers extroversion was an important part of the model explaining MHC. A higher score in extroversion explained 11.2% of the variance in MHC – that is, being more extroverted means a better score in MHC. Age at onset, education and disease duration up to the time of the research were not relevant variables in either model.

Table 5.2 Multiple regression analyses of mental and physical summary score in delayers and non-delayers with disability (UPDRS), age, disease duration, education, extroversion and neuroticism

Variables	Mental summary score		Physical summary score	
	delay < 1 year	delay > 1 year	delay < 1 year	delay > 1 year
UPDRS	-.39***	-.31*	-.62***	-.55***
age at onset signs	.04	-.09	.01	-.09
education	.04	.07	.16	.12
disease duration	.10	-.02	.19	-.01
extroversion	.32**	.12	.07	-.09
neuroticism	-.36**	-.40**	-.22*	-.27*
Model	Adj.R ² =.36	Adj.R ² =.41	Adj.R ² =.39	Adj.R ² =.49
	F-value=7.0***	F-value=5.0***	F-value=7.9***	F-value=8.7***

*p≤.05, ** p≤.01, *** p≤.001; displayed values are Beta's

Discussion

Patients with PD who came earlier to see a health care professional had a significantly lower physical quality of life than delayers, but they did not differ in their mental quality of life. It is supposed, that delayers were less affected by the disease which might have been the reason for the longer delay, and also for the higher physical quality of life.

In both models analyzing MHC and PHC, neuroticism, after disease severity, contributed substantially to the models for non-delayers and delayers. Neuroticism was negatively related to both the mental health and the physical health component of the HRQOL. It can be hypothesized that neuroticism is a reaction to getting a chronic and quality-of-life decreasing disease such Parkinson's disease. This idea is supported by the findings of a large British study [24]. The feelings of anxiety and worry are rather stable components of neurological diseases in comparison with healthy control samples. A high score in neuroticism was in several studies also mentioned as a factor closely related to depression, which is one of the symptoms of PD patients, but it is also associated with other neurological diseases [24-26].

Extroversion was associated with the prediction of a better score in MHC in non-delayers. Extroverted people are sociable; they prefer changes, crave excitement and act impulsively [27]. Several studies found that the possibility of sharing feelings with somebody has a significant impact on the decision to consult a specialist. In one British study, among the important factors associated with longer patient delay was not disclosing the discovery of the breast symptom immediately to someone else and seeking help only after being prompted by others [28]. A positive correlation was found between 'asking others for advice' and the decision to visit a specialist early also in studies from various countries [29,30]. This association was confirmed indirectly by a French study of 100 patients with head and neck cancer, where 43% of the patients who lived alone and 21% of those who lived with a partner delayed consultation. In the same study 'living with a partner' correlated with higher anxiety, which implies that anxiety caused by the partner's observations may have been the motivating factor that induced the patients to seek consultation earlier [31]. The other person could facilitate the recognition of the potential seriousness of the situation and the decision to seek medical advice [32]. This corresponds with the results of Smith and colleagues (2005), who mentioned that others noticed changes, such as weight loss and lethargy, and they made the connection between symptoms and illness for the patient, who discussed his or her vague symptoms with them [33]. Consequently, it can be hypothesized, that extroverts have more social interactions which can lead to earlier help-seeking behavior.

A limitation of this study was the relatively low response rate, which

may have an impact on generalization of the results to the total population of PD patients. Non-respondents were older than respondents, and a possible reason for refusing participation in the study could be the presence of more serious motor complications associated with higher stages of PD and the increasing need for help from their social surroundings compared with the participants. We are regrettably missing information about disease duration and disease severity in the non-respondents.

Our study showed that personality traits, especially extroversion and neuroticism, are closely associated with HRQOL in patients with PD. More sociable patients have a greater chance of getting medical help sooner than patients who are isolated. Disease severity and the number of social interactions associated with an extroverted personality seem to be important for decision-making. It is also evident that neuroticism is associated with a decrease in overall perception of quality of life in patients with Parkinson's disease, but it is not associated with patient's delay. Recent treatment of PD patients is primarily concerned with the improvement of motor functioning and on symptoms that lower quality of life decreasing [34]. Currently, treatment options for neurodegenerative diseases, including parkinsonism, are limited and mainly affect only the symptoms of a disease and have no significant disease-modifying effect [35]. Early help-seeking behavior will be important in the future, when a neuroprotective therapy is developed for patients having PD [36]. Under such conditions, seeking help sooner will mean better chances to limit the progress of the disease in its early phase, when the impact of the disease on a patient's quality of life is not yet very significant.

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References

- [1] Damiano AM, Snyder C, Strausser B, Willian MK. A review of health-related quality of life concepts and measures for Parkinson's disease. *Quality of Life Research* 1999; **8**: 235-243.
- [2] Schrag A, Jahanshahi M, Quinn N. How does Parkinson's disease affects quality of life? A comparison with quality of life in general population. *Movement Disorders* 2000; **15**: 1112-1118.
- [3] Simons G, Thompson SB, Smith-Pasqualini MC. An innovative education program for people with Parkinson's disease and their careers. *Parkinsonism and Related Disorders* 2006; **12**: 478-485.

- [4] Arndt V, Sturmer T, Stegmaier C, Ziegler H, Dhom G, Brenner H. Patient delay and stage of diagnosis among breast cancer patients in Germany: a population based study. *British Journal of Cancer* 2002; **86**: 1034-1040.
- [5] Davalos A. Thrombolysis in acute ischemic stroke: successes, failures and new hopes. *Cerebrovascular Diseases* 2005; **20**(suppl 2): 135-139.
- [6] Hirvonen TP, Halinen MO, Kala RA, Olkinuora JT. Delays in thrombolytic therapy for acute myocardial infarction in Finland. Results of a national thrombolytic therapy delay study. Finish Hospitals' Thrombolysis Survey Group. *European Heart Journal* 1998; **19**: 885-892.
- [7] Richards MA, Westcombe AM, Love SB, Littlejohns P, Ramirez AJ. Influence of delay on survival in patients with breast cancer: a systematic review. *Lancet* 1999; **353**: 1119-1126.
- [8] Moser DK, Kimble LP, Alberts MJ, *et al.* Reducing delay in seeking treatment by patients with acute coronary syndrome and stroke: A scientific statement from the American Heart Association council on cardiovascular nursing and stroke council. *Journal of Cardiovascular Nursing* 2007; **22**: 326-343.
- [9] Grosset D, Taurah L, Burn DJ, *et al.* A multicentre longitudinal observational study of changes in self reported health status in people with Parkinson's disease left untreated at diagnosis. *Journal of Neurology, Neurosurgery, and Psychiatry* 2009; **78**: 465-469.
- [10] Forsaa EB, Larsen JP, Wentzel-Larsen T, Herlofson K, Alves G. Predictors and course of health-related quality of life in Parkinson's disease. *Movement Disorders* 2008; **23**: 1420-1427.
- [11] McDowell I, Newell C. Measuring health: A guide to rating scales and questionnaires (2nd ed.). New York: Oxford University Press, 1996.
- [12] Kai I, Ohi G, Kobayashi Y, Ishizaki T, Hisata M, Kiuchi M. A possible health index for elderly. *Asi-Pacific Journal of Public Health* 1991; **5**: 221-227.
- [13] Hughes AJ, Daniel SE, Kilford L, Lees AJ. Accuracy of clinical diagnosis of idiopathic Parkinson's disease: a clinico-pathological study of 100 cases. *Journal of Neurology, Neurosurgery and Psychiatry* 1992; **55**: 181-184.
- [14] Folstein MF, Folstein SE, McHough PR. "Mini-Mental State". A practical method for grading the cognitive state of patients for the clinician. *Journal Psychiatric Research* 1975; **12**: 189-198.
- [15] van Hilten JJ, van der Zwan AD, Zwinderman AH, Ross RA. Rating impairment and disability in Parkinson's disease: evaluation of the Unified Parkinson's disease Rating Scale. *Movement Disorders* 1994; **9**: 84-88.

- [16] Ware J, Sherbourne CD. The MOS 36-Item Short-Form Health Survey (SF-36). *Medical care* 1992; **30**: 473-483.
- [17] Ware J, Snow K, Kosinski M, Gandek B. SF-36 Health Survey: manual and interpretation guide. Boston: The Health Institute, New England Medical Center, 1993.
- [18] Francis LJ, Brown LB, Philipchalk R. The development of an abbreviated form of the Revised Eysenck Personality Questionnaire (EPQR-A): its use among students in England, Canada, The USA and Australia. *Personality and Individual Differences* 1992; **13**: 443-449.
- [19] Kozeny J. Faktorová struktura 24 položkové formy dotazníku EPQR-A [Factor structure of the 24 items questionnaire EPQ-A]. *Československá psychologie* 2001; **45**: 289-301.
- [20] Forrest S, Lewis CA, Shevlin M. Examining the factor structure and differential functioning of the Eysenck personality questionnaire revised-abbreviated. *Personality and Individual Differences* 2000; **29**: 579-588.
- [21] Newcombe RG, Altman DG. Proportions and their differences. In: Altman DG, Machin D, Bryant TN, eds. *Statistic with confidence*. London: BMJ Books, 2000.
- [22] Horstink M, Tolosa E, Bonuccelli U, *et al.* European Federation of Neurological Societies; Movement Disorder Society-European Section. Review of the therapeutic management of Parkinson's disease. Report of a joint task force of the European Federation of Neurological Societies and the Movement Disorder Society-European Section. Part I: early (uncomplicated) Parkinson's disease. *European Journal of Neurology* 2006; **13**:1170-1185. a
- [23] Horstink M, Tolosa E, Bonuccelli U, *et al.* European Federation of Neurological Societies; Movement Disorder Society-European Section. Review of the therapeutic management of Parkinson's disease. Report of a joint task force of the European Federation of Neurological Societies (EFNS) and the Movement Disorder Society-European Section (MDS-ES). Part II: late (complicated) Parkinson's disease. *European Journal of Neurology* 2006; **13**:1186-1202. b
- [24] Ishihara-Paul L, Wainwright NWJ, Khaw K-T, Luben RN, Welch AA, Day NE, Brayne C, Surtees PG. Prospective association between emotional health and clinical evidence of Parkinson's disease. *European Journal of Neurology* 1992; **15**: 1148-1154.
- [25] Morris PL, Robinson RG, Samuels J. Depression, introversion and mortality following stroke. *Australian and New Zealand Journal of Psychiatry* 1993; **27**: 443-449.
- [26] Morris PLP, Robinson RG. Personality neuroticism and depression after stroke. *International Journal of Psychiatry in Medicine* 1995; **25**: 93-102.

- [27] Eysenck HJ, Eysenck SBG. Manual of the Eysenck Personality Inventory. London: London University of London Press, 1994.
- [28] Burgess CC, Ramirez AJ, Richards MA, Love SB. Who and what influences delayed presentation in breast cancer? *British Journal of Cancer* 1998; **77**: 1343-1348.
- [29] de Nooijer J, Lechner L, de Vries H. A qualitative study on detecting cancer symptoms and seeking medical help; an application of Andersen's model of total delay. *Patient Education and Counseling* 2001; **42**: 145-157.
- [30] Kentsch M, Rodemerck U, Müller-Esch G, Schnoor U, Münzel T, Ittel TH, Mitusch R. Emotional attitudes toward symptoms and inadequate coping strategies are major determinants of patient delay in acute myocardial infarction. *Zeitschrift Für Kardiologie* 2002; **91**: 147-155.
- [31] Rozniatowski O, Reich M, Mallet Y, Penel N. Psychosocial factors involved in delay consultation by patients with head and neck cancer. *Head Neck* 2005; **4**: 274-280.
- [32] Burgess CC, Hunter MS, Ramirez AJ. A qualitative study of delay among women reporting symptoms of breast cancer. *British Journal of General Practice* 2001; **51**: 967-971.
- [33] Smith LK, Pope C, Botha JL. Patient's help-seeking experiences and delay in cancer presentation: a qualitative synthesis. *Lancet* 2005; **366**: 825-831.
- [34] Behari M, Srivastava AK, Pandey RM. Quality of life in patients with Parkinson's disease. *Parkinsonism and Related Disorders* 2005; **11**: 221-226.
- [35] Abdin AA, Hamouda HE. Mechanism of the neuroprotective role of coenzyme Q10 with or without L-dopa in rotenone-induced parkinsonism. *Neuropharmacology* 2008; **55**: 1340-1346.
- [36] Schapira AHV, Olanow CW. Neuroprotection in Parkinson's Disease: Mysteries, Myths, and Misconceptions. *JAMA: Journal of the American Medical Association* 2004; **291**: 358-364.