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Sociodemographic Factors Affecting the Disease Acceptance and the Quality of Life in Patients With Parkinson's Disease: A Preliminary Study

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Abstract

Purpose: Parkinson's disease (PD) significantly affects functioning of patients, thereby lowering their quality of life. The aim of this study was to evaluate the influence of sociodemographic variables on illness acceptance and quality of life in patients with idiopathic PD.

Design: This is a cross-sectional research study.

Methods: The study was conducted with 50 patients with PD. The diagnostic survey method was applied for the purposes of this study with the use of the Parkinson's Disease Questionnaire, the Acceptance of Illness Scale, and a study-specific demographic questionnaire that included questions about sociodemographic data. Multivariable logistic regression was derived to define independent predictors of quality of life.

Findings: Men assessed quality of life in the bodily discomfort domain as significantly worse than women ($p = .0214$). Age negatively and significantly affected the assessment of quality of life in particular domains. Professionally active respondents significantly more often accepted their disease than others ($p = .0070$).

Conclusions and Clinical Relevance: Being professionally active, living in urban areas, and having higher education and higher financial status increase subjective assessment of quality of life in patients with PD. Knowing the impact of sociodemographic variables on quality of life allows rehabilitation nurses to plan nursing and rehabilitation activities more effectively and in line with the capacity of a patient and caregivers.

Keywords: Cross-sectional study; Parkinson's disease; quality of life.

Introduction

Parkinson's disease (PD) is one of many progressive neurodegenerative disorders and, despite the availability of symptomatic treatment, remains a debilitating and incurable disease (Singleton, Farrer, & Bonifati, 2013). It is estimated that there are over a million people suffering from PD in Europe (Olesen et al., 2012). Globally, the number of people with PD is estimated to be 10 million (Parkinson's Disease Foundation, 2016). In Poland, although no thorough epidemiological studies have been conducted, it has been estimated that about 60,000–80,000 people suffer from PD (Sławek, 2007). Based on epidemiological studies, aging is acknowledged to be the greatest risk factor for developing PD (Hipkiss, 2014; Reeve, Simcox, & Turnbull, 2014). Considering the results of epidemiological forecasting related to the growing number of aging European Union populations, it is predicted that the number of patients with PD will grow (Dorsey et al., 2007) and will double by 2050 (Bach, Ziegler, Deuschl, Dodel, & Doblhammer-Reiter, 2011), becoming a major challenge for the health policy of European Union countries (Dodel, 2011).

In the etiology of PD, we can observe abnormal dopaminergic neurotransmission in the basal ganglia, which leads to a reduction in striatal dopamine content. Dopamine deficiency causes resting tremor, bradykinesia, muscle rigidity, postural instability, forward-flexed posture, and freezing. Additional symptoms occurring in this group of patients also include sensory symptoms, gastrointestinal

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Cite this article as:
Rosińczuk, J., Pytel, A., & Kołtuniuk, A. (2019). Sociodemographic factors affecting the disease acceptance and the quality of life in patients with parkinson's disease: A preliminary study. *Rehabilitation Nursing, 44*(1), 35–46. doi: 10.1097/rnj.0000000000000149

disorders and dysphagia, depression, anxiety, and sleep disorders (Bloem & Stocchi, 2012; Coelho & Ferreira, 2012).

Many researchers showed the irrefutable impact of PD on the diminishing quality of life in people affected by this disease (Bloem & Stocchi, 2012; Storch et al., 2013). According to Boland and Stacy (2012) and Dodel (2011), one of the most important aims in caring for patients with PD is a constant analysis of their quality of life. Proper management of health policy provides tools to deliver patient care at the highest level, and this factor may result in helping improve patients' quality of life. It also facilitates searching for effective solutions, including early diagnosis and innovative new treatments to prevent, delay onset, or alleviate symptoms of PD, which minimize the risk of psychiatric symptoms (e.g., depression and anxiety; Boland & Stacy, 2012). After Alzheimer's disease, PD is the second most common neurodegenerative disorder. This may have important economic impacts on the international healthcare systems. A lack of treatment options for changing the disease progression, in combination with an increasingly elderly population, portends a rising economic burden on patients and taxpayers (Kowal, Dall, Chakrabarti, Storm, & Jain, 2013).

Parkinson's disease is associated with significant direct and indirect medical costs and impaired quality of life. Specialistic consultations, hospital admissions, and pharmacologic treatment are qualified as direct costs. On the other hand, early retirement and loss of productivity due to disability are indirect costs. Total costs increased with the progression and the severity of the disease, with motor symptoms, cognitive impairment, and chronic pain as main predictors of costs (Martinez-Martín et al., 2015). The annual economic impact of PD in the United States is estimated at $10.8 billion, 58% of which is related to direct medical costs. It can be anticipated that PD will continue to be associated with significant direct and indirect economic costs due to symptom management and disability and will become a serious challenge for healthcare policy (Chen, 2011).

One of the most important factors in improving quality of life is adaptation to life with a disease and to a different life situation (acceptance; Bień, Rzońca, Kańczugowska, & Iwanowicz-Palus, 2015; Jankowska-Polańska, Kasprzyk, Chudiak, & Uchmanowicz, 2016; Obiegło, Uchmanowicz, Wleklik, Jankowska-Polańska, & Kuśmierz, 2016; Rosińczuk & Kołtuniuk, 2017; Stelmach, Lorencowicz, Jasik, & Turowski, 2016). Adaptation and acceptance of life with PD can significantly reduce negative emotional reactions induced by the disease (Niedzielski, Humeniuk, Błaziak, & Fedoruk, 2007).

Acceptance of disease in patients having chronic diseases is not merely about reconciling to ailments and limitations. It contributes to accepting new life challenges resulting from bodily dysfunctions (Uchmanowicz, Jankowska-Polańska, Chabowski, Uchmanowicz, & Fal, 2016). Acceptance of disease is not a sign of weakness or indifference; it stems from the strength of an affected person who accepts and agrees with an inevitable future condition (Niedzielski et al., 2007). Patients try to cope with a disease in different ways, and these attempts depend on many factors, such as the severity of the disease, treatment options, physical symptoms, complications, serious consequences, and personality traits such as hope, optimism, determination, perseverance, and conviction of success (Uchmanowicz, Jankowska-Polańska, Motowidło, Uchmanowicz, & Chabowski, 2016). Lack of acceptance can lead to withdrawal, escaping from difficulties and passive submission to fate (Ambrosio et al., 2015; Marzec, Walasek, Andruszkiewicz, & Banaszkiewicz, 2014; Portillo Vega et al., 2012). Such a definition of acceptance indicates the way patients cope with their disease. The higher the acceptance, the better the adaptation and the lesser the susceptibility to negative emotions (Niedzielski et al., 2007; Obiegło et al., 2016; Uchmanowicz, Jankowska-Polańska, Motowidło, et al., 2016). Identifying the acceptance level of a disease is a part of a more widespread interest of medical science in issues concerning quality of life (Mazurek & Lurbiecki, 2014). This is a result of changes in the ideology of medicine, which has recognized the need for a more comprehensive assessment of the patient's health condition (Bień et al., 2015). This assessment also includes a description of the patient's living standards and social position in the environment (Kazimierska-Zając, Rosińczuk-Tonderys, & Całkosiński, 2011).

Previous studies analyzing the acceptance of disease were conducted among patients with diabetes (Bertolin, Pace, Cesarino, Ribeiro, & Ribeiro, 2015; Bień et al., 2015; Janowski, Kurpas, Kusz, Mroczek, & Jedynak, 2014; Marzec et al., 2014; Niedzielski et al., 2007), chronic respiratory diseases (Jankowska-Polańska et al., 2016; Janowski et al., 2014; Kupcewicz & Abramowicz, 2015; Niedzielski et al., 2007; Uchmanowicz, Jankowska-Polańska, Chabowski, et al., 2016; Uchmanowicz, Jankowska-Polańska, Motowidło, et al., 2016), circulatory system diseases (Niedzielski et al., 2007; Obiegło et al., 2016), nervous system diseases (Janowski et al., 2014), stroke (Kowalska, Bojko, Szczepańska-Gieracha, Rymaszewska, & Rożek-Piechura, 2016; Stelmach et al., 2016), epilepsy (Staniszewska, Religioni, & Dąbrowska-Bender, 2017), myasthenia (Bilińska & Sitek, 2007), and spinocerebellar ataxia (Kazimierska-Zając et al., 2011) and also among older adults (Cybulski, Cybulski, Krajewska-Kulak, & Cwalina, 2017).

Recently published papers show that acceptance of disease (e.g., chronic obstructive pulmonary disease,

chronic somatic diseases, diabetes mellitus, epilepsy, and spinocerebellar ataxia) is affected by sociodemographic variables. Age is a negative predictor of acceptance of disease (e.g., chronic obstructive pulmonary disease); thus, the level of acceptance is abating together with patients' age (Jankowska-Polańska et al., 2016; Janowski et al., 2014; Kupcewicz & Abramowicz, 2015). Gender also has a significant impact on the level of acceptance of the disease (e.g., spinocerebellar ataxia, chronic obstructive pulmonary disease) in favor of women, who has higher level of acceptance (Kazimierska-Zając et al., 2011; Kupcewicz & Abramowicz, 2015). A significant, positive correlation between the level of acceptance of disease (e.g., chronic obstructive pulmonary disease) and patients' education is also observed; the higher the education, the higher the level of acceptance of disease (Jankowska-Polańska et al., 2016). Marital status shows a significant impact on patients' level of disease acceptance (e.g., epilepsy); persons who were not married were characterized by a higher level of disease acceptance, whereas patients experiencing widowhood showed the lowest level (Staniszewska et al., 2017). Also, financial status has a significant impact on the level of acceptance of the disease (e.g., chronic obstructive pulmonary disease, diabetes mellitus); patients with a very good financial status have significantly higher disease acceptance than those who report an average or poor financial status (Bień et al., 2015; Kupcewicz & Abramowicz, 2015).

In addition, clinical factors can influence the acceptance of disease in patients with chronic obstructive pulmonary disease. Longer duration of illness results in a greater number of patients who are affected negatively by a disease (Jankowska-Polańska et al., 2016). The same regularity applies to the number of hospitalizations; every stay in the hospital reduces the level of disease acceptance (Jankowska-Polańska et al., 2016; Kupcewicz & Abramowicz, 2015). The stage of the disease also strongly and negatively correlates with the level of acceptance (Jankowska-Polańska et al., 2016), as well as the intensity of symptoms (Jankowska-Polańska et al., 2016; Uchmanowicz, Jankowska-Polańska, Motowidło, et al., 2016).

In a study by Cybulski et al. (2017), a relationship was noted between the acceptance of disease and the search for emotional support among geriatric patients. Some studies show that the acceptance of disease is connected with functional status, namely the patients with higher level of disease acceptance presents better functional status regarding their daily activities, as well as physical and social functioning (Bilińska & Sitek, 2007; Kowalska et al., 2016; Marzec et al., 2014; Stelmach et al., 2016). Acceptance of disease also has a significant impact on the level of depression, that is, lower level of disease acceptance occurs in more depressive patients (Bilińska & Sitek, 2007; Kowalska et al., 2016; Uchmanowicz, Jankowska-Polańska, Motowidło, et al., 2016).

The assessment of the level of acceptance of disease is a very important part of the holistic care of patients with chronic diseases (Mazurek & Lurbiecki, 2014). However, no previous studies have evaluated the acceptance of disease and the impact of selected sociodemographic variables on the acceptance of disease in patients with PD. Therefore, the aim of this study was to assess the impact of sociodemographic variables on the acceptance of disease and quality of life in people with idiopathic PD.

Methods

Study Design and Participants

A cross-sectional descriptive design with a questionnaire survey was performed. The study included 50 patients diagnosed with PD, who were members of an association that support people with PD in one of the biggest city in Poland. Inclusion criteria were (1) confirmed diagnosis of PD based on medical records, (2) age between 40 and 90 years, and (3) no diagnosis of depression before the diagnosis of PD. Exclusion criteria were (1) secondary Parkinsonism caused by organic disease or brain damage; (2) participants without a confirmed diagnosis of PD; and (3) patients who, for mental reasons (e.g., disorientation), were unable to fill out the survey form.

The research project was approved by the Bioethics Committee of Wroclaw Medical University (KB-534/2016). All participants in the study were informed of its purpose and course and of the possibility of withdrawal from participation at every stage. Informed consent was obtained from all individual participants included in the study, which also covered access to medical records. This study was conducted under a research grant for young scientists founded by the Ministry of Science and Higher Education in Poland from statutory sources (STM. E025.16.042).

Instruments

The diagnostic survey method was applied for the purposes of this study with the use of Parkinson's Disease Questionnaire (PDQ-39; Jenkinson, Fitzpatrick, Peto, Greenhall, & Hyman, 1997), Acceptance of Illness Scale (AIS; Juczyński, 2001), and the author's questionnaire (which included questions about sociodemographic data, i.e., age, gender, marital status, place of residence, education, professional activity, financial status, running a household, and duration of illness).

The PDQ-39 is a versatile tool for subjective assessment of quality of life and health status of patients with

PD. It consists of 39 parameters, arranged in eight groups of issues: mobility (10 items), activities of daily living (6 items), emotional well-being (6 items), stigma (4 items), social support (3 items), cognitions (4 items), communication (3 items), and bodily discomfort (3 items).

The patients responded to PDQ-39 questions about potential problems indicating the frequency with which they experience problems by selecting a response (scoring from 0 to 4) on the scale of frequency: 0 = *never*; 1 = *occasionally*; 2 = *sometimes*; 3 = *often*; 4 = *always*. Response scores range from 0 to 100. Lower scores reflect a good level of functioning, whereas higher scores reflect difficulties in functioning (Jenkinson et al., 1997; Martinez-Martin et al., 2011. The Polish version of the PDQ-39 is a reliable and valid tool for measuring quality of life in patients with PD. Internal reliability values were assessed using Cronbach's alpha: .84 for the original version and .81–.94 for the Polish version (Krygowska-Wajs, Gorecka-Mazur, Tomaszewski, Potasz, & Furgala, 2015).

The AIS was developed in 1984 by Felton and Revenson (1984) and was adapted to Polish conditions in 2001 by Juczyński (2001). The scale determines the degree of acceptance of disease by means of eight statements that describe the subjective attitude of patients to difficulties and limitations caused by illness. The total score is a measure of the degree of illness acceptance, ranging from 8 to 40 (lower scores worse). Scores of 8–18 indicate a lack of acceptance of the disease, scores of 19–29 indicate an average level of acceptance, and scores of 30–40 indicate acceptance of the health situation at a high level. Low scores indicate lower adaptation to limitations imposed by the disease, and high scores indicate good acceptance of illness and lack of negative emotions associated with the disease. The AIS has good psychometric features, with reliability of the Polish version close to the accuracy of the original version. Cronbach's alpha values were .85 for the Polish version and .82 for the original version, whereas the test–retest reliability values were 0.64 for the Polish version and 0.69 for the original version (Juczyński, 2001).

Data Analysis

Data were analyzed with Statistica 12 (Stat Soft, Inc., Tulsa, OK). For all variables, the mean and standard deviation were calculated. For qualitative variables, incidence rates (percent) were calculated. Shapiro–Wilk test was performed to assess the normality of distribution for the tested variables. The comparisons of results depending on the sociodemographic characteristics were performed using the Mann–Whitney *U* test and the nonparametric analysis of variance Kruskal–Wallis analysis and multiple comparisons of mean ranks. Comparison of qualitative variables was performed using chi-square test. In addition, it defined the relationship between selected variables using the Spearman's rank correlation test. Simple and multiple linear regression (forward stepwise regression) analyses were used to calculate the relationship between the studied variables. The multiple linear regression analysis included factors potentially affecting the score of PDQ or AIS questionnaires, such as age, place of residence, education, marital status, professional activity, financial status, running a household, and duration of illness. The results were considered significant at a p value of $< .05$.

Results

The study involved 50 patients treated only pharmacologically to suppress the symptoms of PD. The detailed sociodemographic data of the study group are shown in Table 1. In addition to the primary disease, the studied patients were also treated for arterial hypertension (38%), osteoarthritis of the spine (32%), and heart failure (12%).

Sociodemographic factors affecting quality of life as measured using PDQ-39 include gender, age, place of residence, education, marital status, professional activity, financial status, running a household, and duration of illness.

The study findings revealed that men evaluate their quality of life, in terms of the bodily discomfort domain, as significantly lower than women ($p = .0214$). In other domains, there was no significant difference observed in terms of gender.

Analysis of the study material showed that age is an important variable affecting the assessment of quality of life among studied patients. The older the studied patients were, the lower the assessment of quality of life in the domains of mobility, activities of daily living, stigma, and cognitions (Table 2).

Residents of villages or towns of up to 25,000 residents assessed their quality of life in the domains of emotional well-being ($p = .0483$) and stigma ($p = .0006$) as significantly lower than those living in cities of over 100,000 residents.

Level of education has a significant impact on the assessment of quality of life in patients with PD. Patients with higher education assessed their quality of life in domains of mobility ($p = .0388$), activities of daily living ($p = .0261$), and emotional well-being ($p = 0.0362$) as significantly higher than patients with primary education or vocational education.

Single or divorced patients assessed their overall quality of life as significantly higher and in some domains higher than those who are married or widowed. Detailed data are presented in Table 2.

Table 1 Characteristics of the study group

Variables	*n*	%
Gender		
Male	26	52.0
Female	24	48.0
Age (years)		
≤60	13	26.0
61–70	24	48.0
≥71	13	26.0
Place of residence		
Village or town with up to 25,000 residents	12	24.0
City with 25,000–100,000 residents	17	34.0
City with over 100,000 residents	21	42.0
Education		
Basic or vocational education	6	12.0
Secondary education	26	52.0
Higher education	18	36.0
Marital status		
Married/relationship	33	66.0
Widow/widower	8	16.0
Single/divorced	9	18.0
Professional activity		
Employed	9	18.0
Disability pension	10	20.0
Retirement pension	30	60.0
Financial status[a]		
Bad	6	12.0
Medium	29	58.0
Good	15	30.0
Running a household		
Independently	8	16.0
With a close person	20	40.0
With family	22	44.0
Duration of illness		
<5 years	17	34.0
6–10 years	23	46.0
>10 years	10	20.0

[a]Bad: Income is not sufficient to cover basic expenses related to everyday life —food, rent, taxes, clothes. Medium: Income is sufficient to cover basic expenses. Good: income is sufficient to cover basic expenses and to have savings.

Professional activity significantly differentiates patients in terms of quality of life assessment. Professionally active patients assessed their overall quality of life (p = .0009) and in particular domains such as mobility (p = .0165), activities of daily living (p = .00470), cognitions (p = .0235), bodily discomfort (p = .0139), and communication (p = 0.0027) as significantly higher than those who receive disability pension. It was also shown that disability pensioners assessed their quality of life in the stigma domain (p = .0041) as significantly lower than pensioners/retirees.

It was shown that patients who subjectively evaluated their financial status as bad assessed their quality of life in the domains of social support (p = .0416) and bodily discomfort (p = .0319) as significantly lower than other patients. In other domains, subjective evaluation of financial status did not affect the assessment of quality of life.

Patients living in the same household as family assessed their overall quality of life (p = .0281) and the domains of mobility (p = .0283), activities of daily living (p = .0128), and bodily discomfort (p = .0472) as significantly lower than independent patients living alone.

Analysis of the study material also indicated a positive correlation between the duration of the disease and the assessment of quality of life among the studied patients with PD. This means that patients who suffer from PD longer assess their quality of life lower in most domains (except for the well-being domain; Table 3).

Quality of Life Predictors

Multivariate analysis (using linear regression) was performed to identify the predictors of quality of life. The following independent variables were introduced into the analysis: age, place of residence, education, marital status, professional activity, financial status, running a household, and duration of illness. The regression analysis showed that quality of life in patients with PD is conditioned by age, place of residence, financial status, and duration of the disease. Older people living in rural areas or small towns, assessing their financial status as bad, and suffering long term from PD assessed their quality of life lower than others (Table 4). The resulting model was highly statistically significant (F = 7.14, $p \leq .001$); however, the total variance explained in quality of life was small (around 43%).

Sociodemographic factors affecting the AIS as measured using the AIS Scale include gender, age, place of residence, education, marital status, professional activity, financial status, running a household, and duration of illness.

Analysis of the study material showed that the average score of the AIS questionnaire (range 8–40; higher scores better) for the study group was 25.28 ± 7.26. It was shown that 15.4% of men and 16.7% of women declared no disease acceptance, 19.2% of men and 25.0% of women showed a high level of disease acceptance, whereas 65.4% of men and 58.3% of women showed a moderate acceptance level.

Analysis of the study material showed that people over 70 years old (p = .0290) have a significantly lower acceptance of their disease, whereas those who are professionally active (p = .0070) rated acceptance of their disease significantly higher.

Disease Acceptance Predictors

Multivariate analysis (using linear regression) was performed to identify the predictors of acceptance of disease. The following independent variables were introduced into the analysis: age, place of residence, education, marital status, professional activity, financial status, running

Table 2 Diversity of scoring in domains of quality of life depending on the selected demographic factors

	PDQ-39 Domains							
	Mobility		Activities of Daily Living		Emotional Well-being		Stigma	
Variables	*X* ± *SD*	*p*	*X* ± *SD*	*p*	*X* ± *SD*	*p*	*X* ± *SD*	*p*
Gender		.5733[a]		.5602[a]		0.0546[a]		0.6622a
Male	40.1 ± 27.7		37.6 ± 28.4		29.5 ± 24.1		35.2 ± 28.5	
Female	34.2 ± 21.0		30.6 ± 20.6		38.6 ± 17.9		30.5 ± 20.0	
Age (years)		**.0403[b]**		**.0102[b]**		.3497[b]		**.0397[b]**
≤60	32.3 ± 20		34.1 ± 24.4		36.3 ± 17.2		45.8 ± 18.3	
61–70	31 ± 22.3		24.0 ± 16.4		35.0 ± 20.5		25.5 ± 19.8	
≥71	53.8 ± 27		53.2 ± 29		29.4 ± 27.9		33.8 ± 33.2	
Place of residence		.1263[b]		.1182[b]		**.0352[b]**		**.0009[b]**
Village or town with up to 25,000 residents	49.9 ± 26.0		49.7 ± 31.8		47.0 ± 19.4		52.8 ± 21.9	
City with 25,000–100,000 residents	30.9 ± 21.1		28.9 ± 19.1		29.2 ± 17.8		33.2 ± 18.7	
City with over 100,000 residents	35.2 ± 25.0		29.7 ± 22.2		30.1 ± 23.4		21.4 ± 23.8	
Education		**.0451[b]**		**.0122[b]**		**.0400[b]**		.0783[b]
Basic or vocational education	60.3 ± 24.5		59.0 ± 25.6		51.5 ± 16.4		53.3 ± 29.8	
Secondary education	37.0 ± 23.3		37.2 ± 23.5		35.2 ± 23.7		34.2 ± 24.6	
Higher education	29.9 ± 23.1		21.6 ± 14.9		26.1 ± 16.3		24.3 ± 19.3	
Marital status		.0702[b]		**.0039[b]**		.6202[b]		.5383[b]
Married/relationship	40.5 ± 25.7		39.7 ± 25.9		33.4 ± 23.3		33.8 ± 28.1	
Widow/widower	41.9 ± 18.0		36.5 ± 13.2		39.1 ± 16.7		37.5 ± 13.7	
Single/divorced	21.1 ± 21.0		12.1 ± 17.7		31.0 ± 20.4		25.7 ± 17.7	
Professional activity		**.0209[b]**		**.0060[b]**		0.1244[b]		**.0051[b]**
Employed	20.1 ± 16.9		14.8 ± 10.2		26.6 ± 16.2		35.3 ± 15.7	
Disability pension	50.2 ± 9.1		46.8 ± 17.6		44.2 ± 16.3		52.0 ± 15.2	
Retirement pension	38.7 ± 27.5		36.3 ± 27.4		32.2 ± 24.0		26.5 ± 26.5	
Financial status		.3815[b]		.2232[b]		.1599[b]		.3542[b]
Bad	45.2 ± 27.2		38.3 ± 28.4		50.8 ± 28.6		45.0 ± 30.5	
Medium	39.6 ± 24.3		37.7 ± 25.8		33.3 ± 20.4		33.9 ± 23.8	
Good	29.7 ± 24.1		25.9 ± 21.6		28.2 ± 18.7		26.2 ± 23.4	
Running a household		**.0334[b]**		**.0137[b]**		.3172[b]		.2062[b]
Independently	19.0 ± 16.9		13.5 ± 20.9		24.5 ± 14.8		20.4 ± 14.1	
With a close person	36.0 ± 22.2		36.6 ± 23.8		37.7 ± 21.1		37.7 ± 21.2	
With family	45.1 ± 26.2		39.6 ± 24.5		33.8 ± 23.8		33.8 ± 23.8	

Note. Significant differences ($p < .05$) are shown in bold. PDQ = Parkinson's Disease Questionnaire; *X* ± *SD* = mean ± standard deviation.
[a]Mann–Whitney *U* test.
[b]Analysis of variance Kruskal–Wallis test.

a household, and duration of illness. The results of regression showed that the degree of acceptance of disease among patients with PD is influenced by the place of residence and professional activity. Professionally active people living in towns with a population of 25,000 to 100,000 residents have a higher degree of acceptance of their disease (Table 5). The resulting model was highly statistically significant ($F = 5.16$, $p < .001$); however, the total variance explained in the acceptance of disease was relatively small (around 30%).

Discussion

Aging populations include an increasing number of patients with PD. Parkinson's disease significantly affects the functioning of patients, thereby potentially lowering their quality of life (Stocchi, Martin, & Reichmann, 2014). The aim of this study was to examine the relationship between sociodemographic factors and quality of life of patients with PD. The study by Duncan et al. (2014), conducted in patients with an early diagnosis of PD, showed a much higher quality of life (18.1 points) in comparison to the results of our own study and the studies by Žiropađa et al. (2009), Augustyniuk et al. (2016), and Fan, Chang, and Wu (2016), which showed that longer duration of disease significantly decreases quality of life in patients with PD. However, the studies by Gozdek, Laskowska, Michalak, and Gorzelańczyk (2007; $n = 40$, with mean age of 69.7 years), Yamanishi et al. (2013; $n = 117$, with mean age of 69.4 years), and Žiropađa et al. (2009; $n = 102$, with mean age of 58.4 years) did not

Table 2, continued

Social Suport		Cognitions		Bodily Discomfort		Communications		PDQ-39 (Sum of Scores)	
X ± *SD*	*p*	*X* ± *SD*	*p*	*X* ± *SD*	*p*	*X* ± *SD*	*p*	*X* ± *SD*	*p*
	.4845[a]		.5733[a]		**.0214[a]**		.4606[a]		.9072[a]
17.7 ± 20.1		31.6 ± 21.0		33.9 ± 24.9		41.8 ± 20.3		53.8 ± 31.7	
21.6 ± 21.0		28.3 ± 20.6		17.3 ± 14.7		37.9 ± 17.4		48.7 ± 22.2	
	.6683[b]		**.0010[b]**		.3623[b]		.2150[b]		.2518[b]
19.3 ± 20.2		17.9 ± 15.5		26.2 ± 29		33.5 ± 20.4		49.2 ± 23.1	
20.8 ± 19.3		27.3 ± 18.1		21.8 ± 16.2		21.8 ± 16.2		44.6 ± 22.8	
17.4 ± 23.9		47.2 ± 19.5		33.2 ± 23.6		33.2 ± 23.6		65.9 ± 34.8	
	.7079[b]		.4417[b]		.3250[b]		.5784[b]		**.0338[b]**
22.3 ± 21.0		34.5 ± 25.6		33.9 ± 27.9		43.1 ± 20.5		68.8 ± 32.1	
18.7 ± 20.7		23.7 ± 12.3		26.9 ± 20.7		36.9 ± 17.3		45.1 ± 18.9	
18.6 ± 20.8		32.6 ± 22.7		20.6 ± 18.9		40.6 ± 19.7		46.4 ± 27.3	
	.1072[b]		.1371[b]		**.0374[b]**		.0679[b]		**.0127[b]**
30.7 ± 25.9		36.5 ± 27.7		33.2 ± 27.9		54.3 ± 16.6		79.0 ± 33.9	
21.2 ± 19.7		33.8 ± 19.6		30.4 ± 19.7		39.8 ± 20.1		53.8 ± 26.5	
13.4 ± 18.6		22.4 ± 18.6		17.1 ± 21.8		35.5 ± 16.0		38.6 ± 18.3	
	.5387[b]		**.0509[b]**		**.0169[b]**		**.0282[b]**		**.0354[b]**
21.7 ± 22.5		30.6 ± 20.4		29.0 ± 24.3		42.3 ± 18.9		55.0 ± 29.2	
17.9 ± 14.4		32.0 ± 11.4		46.9 ± 17.1		58.9 ± 12.3			
13.0 ± 16.6		18.3 ± 20.3		9.2 ± 11.3		25.1 ± 13.2		31.3 ± 21.9	
	.0607[b]		**.0007[b]**		**.0144[b]**		**.0021[b]**		**.0013[b]**
12.0 ± 18.2		7.8 ± 7.0		10.2 ± 15.0		21.4 ± 11.8		29.9 ± 12.7	
27.6 ± 13.5		31.4 ± 16.7		39.8 ± 24.4		51.0 ± 9.2		69.3 ± 8.5	
19.2 ± 22.7		36.2 ± 20.7		26.6 ± 20.6		42.3 ± 19.4		52.4 ± 30.6	
	.0416[b]		.5932[b]		**.0319[b]**		**.0503[b]**		.1161[b]
40.3 ± 23.1		36.5 ± 22.1		41.7 ± 31.1		55.5 ± 22.0		68.8 ± 33.9	
18.8 ± 21.1		29.9 ± 19.7		28.7 ± 20.3		40.1 ± 17.9		53.3 ± 26.6	
12.7 ± 12.1		27.7 ± 22.8		14.3 ± 16.5		33.5 ± 16.9		40.5 ± 23.2	
	.0406[b]		.7720[b]		**.0291[b]**		.1190[b]		**.0225[b]**
5.3 ± 7.8		26.1 ± 25.7		8.3 ± 11.7		28.3 ± 21.3		29.0 ± 15.5	
23.0 ± 18.1		29.8 ± 16.7		28.7 ± 21.3		42.7 ± 16.8		54.0 ± 25.2	
21.6 ± 23.8		31.6 ± 22.7		29.9 ± 23.2		41.7 ± 19.0		57.1 ± 29.4	

confirm the existence of a correlation between age and particular domains of quality of life. It seems that this might be a result of a different number of patients in each study.

Also, it should be pointed out that there was a clear trend in the well-being domain with the progression and duration of the disease; however, this result was not statistically significant ($p = .0717$). Nevertheless, it can be assumed that this result could be significant for the larger population studied. Other authors have not conducted such detailed comparisons in the PDQ-39 domain so far, so it is difficult to compare and conclude with similar results.

Table 3 Correlation between PDQ-39 domains and duration of illness

		Spearman's Rank Correlation		
Pair of Variables	*n*	*R* Spearman	*T* (*n* − 2)	*p*
PDQ-39–sum of scores and duration of illness	50	.5777	4.9032	**.0000**
PDQ-39–mobility and duration of illness	50	.5289	4.3172	**.0001**
PDQ-39–activities of daily living and duration of illness	50	.5353	4.3910	**.0001**
PDQ-39–emotional well-being and duration of illness	50	.2569	1.8419	.0717
PDQ-39–stigma and duration of illness	50	.3834	2.8759	**.0060**
PDQ-39–social support and duration of illness	50	.2835	2.0492	**.0459**
PDQ-39–cognitions and duration of illness	50	.3348	2.4616	**.0175**

Note. Significant differences ($p < .05$) are shown in bold. PDQ = Parkinson's Disease Questionnaire.

Table 4 The value of relevant regression coefficients and their statistical significance for the model evaluating the impact of particular independent variables on the value of PDQ-39 score

		PDQ-39–Sum of the Scores						
Linear Regression–Multivariate Regression[a]		*p*	ß	ß *SE*	−95%	+95%	R^2	Adjusted R^2
Age		**.0033**	**.35**	**.11**	**0.12**	**0.57**	**.06**	**−.12**
Place of residence	City with 100,000 residents (*n* = 21)			—				
	Village or town with up to 25,000 residents (*n* = 12)	**.0048**	**.44**	**.15**	**0.14**	**0.74**	**.46**	**.36**
	City with 25,000–100,000 residents (*n* = 17)	.1095	−.23	.14	−0.52	0.05	.42	.31
Financial status	Good (*n* = 15)			—				
	Bad (*n* = 6)	**.0053**	**.41**	**.14**	**0.13**	**0.70**	**.44**	**.33**
	Medium (*n* = 29)	.1540	−.21	.14	−0.50	0.08	.41	.30
Duration of illness		**.0081**	**.32**	**.11**	**0.09**	**0.55**	**.10**	**−.08**

Note. Significant differences ($p < .05$) are shown in bold. $F = 7.14$; $p = .00003$; $R^2 = .51$; adjusted $R^2 = .43$. PDQ = Parkinson's Disease Questionnaire.
[a]Only significant variables are shown from the variables entered: age, place of residence, education, marital status, professional activity, financial status, running a household, duration of illness.

Age, among other sociodemographic factors, is an important variable contributing to the deterioration of quality of life in patients with PD (Augustyniuk et al., 2016; Winter et al., 2010), which was also confirmed in our study. However, the studies by Gozdek et al. (2007), Yamanishi et al. (2013), and Žiropađa et al. (2009) did not confirm the existence of a correlation between age and particular domains of quality of life.

The results of this study showed that men assessed their quality of life in the domain of bodily discomfort as significantly lower than women, whereas studies by other authors (Carod-Artal, Vargas, & Martinez-Martin, 2007; Navarro-Peternella & Marcon, 2012; Wu et al., 2014) showed that women assessed their quality of life in the domain of bodily discomfort as significantly lower than men. These contrasting results could be related to cultural factors. During illness, Polish women do not stop performing their social functions (mothers and wives) and do not have time for self-pity. However, when men get sick, they often verbalize their difficulties and discomforts. Gozdek et al. (2007) and Lubomski, Louise Rushworth, Lee, Bertram, and Williams (2014), however, showed that, in comparison to women, men assessed their quality of life in the domain of communications significantly lower, whereas Brazilian (Navarro-Peternella & Marcon, 2012) and Australian (Lubomski et al., 2014) studies revealed that men with PD demonstrated lower assessment of quality of life in the domains of social support, activities of daily living, and cognition. Conversely, studies by Schrag, Jahanshahi, and Quinn (2000) and Lawrence, Gasson, Kane, Bucks, and Loftus (2014) showed that the gender factor does not affect quality of life in patients with PD. In contrast, studies by Fan et al. (2016), Kovács et al. (2016), and Liu et al. (2015) showed that women with PD evaluated their quality of life significantly lower than men. It appears relevant to conduct further studies with the aim to verify the existence of gender impact on quality of life in patients with PD.

The present study showed that the level of education influences the assessment of quality of life in patients with PD. Patients with higher education had significantly higher health-related quality of life (HRQOL) scores measured by PDQ-39 than patients with primary school education. This finding confirms findings of Carod-Artal et al. (2007),

Table 5 The value of relevant regression coefficients and their statistical significance for the model evaluating the impact of particular independent variables on the value of the AIS score

		AIS–Sum of the Scores						
Linear Regression–Multivariate Regression[a]		*p*	ß	ß *SE*	−95%	+95%	R^2	Adjusted R^2
Age		.1443	−.28	.19	−0.66	0.10	.59	.51
Place of residence	City with over 100,000 residents (*n* = 21)			—				
	Village or town with up to 25,000 residents (*n* = 12)	.0625	−.30	.16	−0.61	0.02	.41	.30
	City with 25,000–100,000 residents (*n* = 17)	**.0113**	**.41**	**.16**	**0.10**	**0.73**	**.40**	**.28**
Professional activity	Retirement pension (*n* = 30)			—				
	Employed (*n* = 9)	**.0325**	**.45**	**.20**	**0.04**	**0.86**	**.65**	**.58**
	Disability pension (*n* = 10)	**.0182**	**−.43**	**.18**	**−0.79**	**−0.08**	**.53**	**.44**

Note. Significant differences ($p < .05$) are shown in bold. $F = 5.16$; $p = .0009$; $R^2 = .38$; adjusted $R^2 = .30$. AIS = Acceptance of Illness Scale.
[a]Only significant variables are shown from the variables entered: age, place of residence, education, marital status, professional activity, financial status, running a household, duration of illness.

who showed that education, measured as the number of years of formal education, was an independent predictor of HRQOL in the multivariate analysis model, as well as findings of Pontone, Mari, Perepezko, Weiss, and Bassett (2017), who investigated that more years of education had a positive effect on quality of life on the Parkinson's Disease Quality of Life Questionnaire total score. Although the influence of education level on HRQOL remains questionable, its positive effect might be related with higher socioeconomic status and greater awareness of complex medical issues.

The present study showed that single or divorced patients assessed their quality of life higher than those who are married. This contradicts to the results obtained in the study by Wu et al. (2014), which showed that single or divorced people assessed quality of life in the stigma and social support domains as significantly lower, and the results obtained by Carod-Artal et al. (2007), where divorced respondents also assessed quality of life in the domains of cognition and emotional well-being as significantly lower. The difference in research results is most likely due to the fact that people in relationship often feel a burden to their loved ones and blame themselves for all the difficulties their family members face. Thus, they may assess their quality of life lower.

The studies by Klepac et al. (2007) and Soh, McGinley, Watts, Iansek, and Morris (2012) showed that patients living in rural areas had a significantly lower quality of life. Wu et al. (2014) claimed that rural living predicted lower mobility, activities of daily living, and emotional well-being, which is confirmed by the results of this study. It can be assumed, with a lot of probability, that PD patients living in rural areas are less available to medical services and health care provided at the highest quality level. This fact may have a negative impact on the therapeutic process, which directly affects the perception of quality of life as decreased.

People with PD who underwent rehabilitation (physical exercises) and speech therapy assessed their quality of life significantly higher than those who did not undergo such forms of rehabilitation (Tickle-Degnen, Ellis, Saint-Hilaire, Thomas, & Wagenaar, 2010). It is necessary not to forget the importance of social support and rehabilitation for PD patients. The following goals of social rehabilitation should be implemented gradually and carefully: developing personal resourcefulness and motivating participation in social activity, developing skills related to self-fulfillment of social roles, adapting to disease-altered living conditions and financial support, and assisting in integration into various spheres of public life and interpersonal contacts (Takahashi, Kamide, Suzuki, & Fukuda, 2016).

As this study has shown, patients evaluating their economic status as low, such as disabled pensioners whose financial benefits in Poland are quite low, scored their quality of life lower. However, studies in Russia have shown that lack of social support has a significant impact on the deterioration of quality of life in patients with PD (Winter et al., 2010).

This study also assessed the impact of sociodemographic factors on the acceptance of disease in patients with PD. No studies about disease acceptance in patients with PD have been conducted in Poland so far. Similarly, foreign sources of literature on the acceptance of disease in patients with PD have not yet explored the subject in detail. The results of this study indicate that acceptance of the disease in a group of patients with PD is on a similar level as in patients with ataxia, myasthenia gravis, and epilepsy (Bilińska & Sitek, 2007; Kazimierska-Zając et al., 2011; Staniszewska et al., 2017). This result is interpreted as average. This may be interpreted that adaptation to the disease in patients with PD is similar to that in other chronic neurological disorders of unpredictable and variable manner.

The study conducted by Janowski et al. (2014) among people with chronic diseases showed that age is a negative predictor of acceptance of disease. This was confirmed in our study. However, a dissertation by Baker (1998), which recently is only one in the area of research in PD patients, showed that there is a negative correlation between time since diagnosis and acceptance of disease, which suggests that there is a greater acceptance of disease closer to the point when a patient is first diagnosed, but this was not confirmed in our study. The results obtained by Baker (1998) seem to be logical in that as the disease progresses and symptoms increase and there are newer and more recent symptoms, the patient is then less likely to cope with the disease, which transfers directly into a lower degree of acceptance. In our study, we did not obtain statistically significant correlation ($p = .065$, $\beta = -.23$), but the trend was similar to that of Baker (1998).

This study showed that active people have a higher level of disease acceptance. Cybulski et al. (2017) showed that those older adults (over 60 years old) who actively participate in the activities organized by various institutions, for example, University of the Third Age (also known as U3A, an international movement whose aims are the education and stimulation of mainly retired members of the community), are characterized by higher acceptance of disease. This means that being active in the physical, mental, social, and professional sense allows for better adaptation to changing conditions, emerging difficulties, and limitations associated with the disease.

Key Practice Points

- Parkinson's disease is one of neurodegenerative disorders of the central nervous system. It is characterized by numerous symptoms, which significantly affect functioning of patients, thereby lowering their quality of life.
- Sociodemographic factors, that is, being professionally active, living in urban areas, and having higher education and higher socioeconomic status increase subjective assessment of quality of life.
- Lack of disease acceptance can lead to withdrawal, escape from difficulties, and passive submission to fate.
- Knowing the impact of sociodemographic variables on quality of life allows rehabilitation nurses to plan nursing and rehabilitation activities more effectively in line with the capacity of a patient and caregivers and thus improve their quality of life and daily functioning.

Implication for Nursing Practice

A nurse is one of the most important persons involved in the caring process of a patient with PD. The role of a rehabilitation nurse is primarily to motivate a patient to take actions that will lead to a slowing in disease progression and to self-manage their disease (e.g., encouraging a patient to participate in classes with a speech therapist, to talk to a psychologist, and exercise with a physiotherapist or rehabilitation nurse).

Knowing the impact of sociodemographic variables on quality of life allows rehabilitation nurses to plan nursing and rehabilitation activities more effectively in line with the capacity of the patient and caregivers and thus improve their quality of life and daily functioning. Rehabilitation nurses provide care, education, and support to the PD patients and their families. Nursing interventions are focused on assisting PD patients, their families, and their communities in developing PD patients' self-care skills. The rehabilitation nurse provides and coordinates essential interventions facilitating PD patients' adaptation to new roles and to the environment. The three superordinate goals for nursing rehabilitation can be summarized as maximizing self-determination, restoring function, and optimizing patients' lifestyle choices (Spasser, 2006).

In the context of neurological rehabilitation, nurses support the actions for health promotion aimed at motor recovery, but mainly for the adaptation to limitations imposed by the disability, according to the needs of each PD patient and his or her family. These actions are primarily guided by functional, psychological, social, and spiritual aspects. Rehabilitation nurses also use competencies beyond the biological aspect in their practice and recognize that the actions required for adherence to long-term treatment and care are deeply interrelated with the culture, lifestyle, habits, routines, and rituals of PD patients (Tosin, Campos, Andrade, Oliveira, & Santana, 2016).

This observational cohort study showed that the place of residence and financial status influence quality of life of patients with PD. However, to obtain an unambiguous answer to the question of whether changing above-mentioned predictors will improve quality of life, a comparative study or randomized clinical trial is needed. This would allow finding more specific solutions toward personalizing treatment and advancing nursing rehabilitation, which leads obtaining better patient outcomes.

Limitation

When discussing the findings from this study, some of its limitations should be noted. First of all, there was the small sample size, which was too low to make inferences and generalizations of the findings to a broad population of patients with PD. On the other hand, it appears relevant to conduct further studies on the larger homogenous sample with the aim to verify the existence of the impact of sociodemographic factors on the acceptance of the disease and quality of life in patients with PD. Second, this was only a cross-sectional study, and the direction of cause among the variables examined cannot be determined. Finally, the acceptance of the disease, which was the main outcome variable chosen for the analysis, conceptualizes adjustment in a strictly psychological manner. No indices of somatic health status were directly measured as outcome variables in this study; therefore, the sociodemographic relationships that were found can only be called a psychological adjustment rather than a somatic status. A better understanding of the factors that have the greatest effect on a patient's acceptance of disease and quality of life is important for developing new management plans in PD.

Conclusion

This study showed that older age and disease duration significantly decrease quality of life in patients with PD, and being professionally active, living in urban areas, and having higher education and higher socioeconomic status increase the subjective assessment of quality of life. However, the level of disease acceptance in patients with PD is affected by the place of residence and professional activity.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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