

The prevalence of Parkinson's disease among Vilnius inhabitants

Research Article

Vaineta Valeikiene*, Jelena Ceremnych, Diana Mieliauskaite, Vidmantas Alekna

*Institute of Experimental and Clinical Medicine at Vilnius University,
Center of Gerontology and Rehabilitation,
Vilnius, LT – 08420, Lithuania*

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Abstract: In a hospital-based study we investigated the prevalence of Parkinson's disease among inhabitants of the Vilnius city, the capital of Lithuania. The study group was selected from patients who were diagnosed with Parkinson's disease during the time frame of 1978–2005. Patients' time of diagnosis were based on the data of dispensary cards, registration journals and/or other documentation. A questionnaire and Mini Mental State Examination provided data for analysis on the conditions of the patients. The prevalence of Parkinson's disease in Vilnius is 1.32/1000 inhabitants and is higher in men than in women ($p < 0.05$). The age of Parkinson's disease onset in men and women is the same (63.77 ± 0.70 years). The rigidity-tremor form of Parkinson's disease is the most frequent (76.8% of all cases). The PD prevalence rate in Vilnius inhabitants are close to the mean levels observed in studies made in Finland, Austria, Germany. The prevailing form of Parkinson's disease is rigidity-tremor.

Keywords: *Parkinson's disease • Prevalence • Epidemiological study*

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1. Introduction

Parkinson's disease (PD) belongs to a group of neurodegenerative diseases, being one of the most frequent of them [1-3]. According to the data of various authors the prevalence of PD to fluctuate from 24 to 400 cases per 100 000 population and the incidence varies from 2 to 24 cases per 100 000 population per year [4-9]. The present study was undertaken with the aim to estimate the prevalence of Parkinson's disease in the population of Vilnius – the capital of Lithuania, one of the European post-communist countries in which no epidemiological studies of this kind have been made, as well as to evaluate the frequency of separate clinical forms of Parkinson's disease.

2. Material and Methods

The study group embraced all inhabitants of Vilnius with a clinical diagnosis of Parkinson's disease between 1978 and 2005, who were alive on January 1, 2005,

had a history of "Parkinson's disease", "Parkinson's syndrome" or "parkinsonism" and had been treated with antiparkinsonian medicine. The final list of study subjects included 202 patients (115 women and 87 men) who corresponded to the clinical criteria of Parkinson's disease.

During selection, the diagnosis of PD was established according to the following clinical criteria: (1) tremor; (2) bradikinesia, hypokinesia and akinesia; (3) rigidity; (4) positive response to levodopa treatment; and, (5) asymmetrical beginning of the disease. The main criterion is bradikinesia, hypokinesia or akinesia.

The questionnaire included the unified Parkinson's disease rating scale of Fahn and Elton as a basis for evaluation of patients thinking, behaviour, mood, daily living activity scale and movement abilities. The stage of the disease was determined with the aid of a modified scale of Hoehn and Yahr. Mini Mental State Examination was applied to define disorders of the cognitive functions.

* E-mail: vainetav@ktl.mii.lt

Table 1. The prevalence of Parkinson's disease in different age and sex groups in Vilnius (For 1000 of inhabitants in 2005-01-01).

Age	Men			Women			Totally		
	Population	Number of patients	Prevalence	Population	Number of patients	Prevalence	Population	Number of patients	Primary sickness rate
50-59	28233	10	0.34	36295	19	0.53	64528	29	0.45
60-69	21626	32	1.47	30188	47	1.55	51814	79	1.51
70-79	8485	32	3.86	18449	43	2.43	26934	75	2.88
80-89	2197	13	5.69	5971	6	1.03	8168	19	2.29
Totally	60541	87	1.66	90903	115	1.21	151444	202	1.32

3. Results

3.1. Prevalence of Parkinson's disease

The prevalence of Parkinson's disease (on January 1, 2005) was 1.33 per 1000 inhabitants of Vilnius, or 1.32/1000 per European standard population (95% CI 1.14–1.51).

The study group included 202 patients (115 (56.9%) women and 87 (43.1%) men, correlation 1.32). The prevalence of PD was 1.44/1000 inhabitants, or 1.66 per 1000 European standard population among men (95% CI 1.29–2.04), and 1.27/1000 (1.21 per 1000 ESP (95% CI 0.98–1.44)) among women.

Table 1 shows the prevalence of Parkinson's disease in different age groups of Vilnius inhabitants.

We found statistically reliable differences in the prevalence of PD between the sexes ($p < 0.05$). Men were found to be more likely to fall ill with PD. Also, statistically reliable differences between women and men in the 50–59 and 60–69 year age groups ($p < 0.001$) were observed. In addition, there were ascertained statistically reliable differences among age groups: (1) amongst men aged 50–59 and 80–89 years ($p < 0.001$); and, (2) amongst women aged 50–59 and 70–79 years ($p < 0.001$), 60–69 and 70–79, and 70–79 and 80–89 years ($p < 0.05$). A statistically reliable difference among all age groups ($p < 0.001$) was found. The prevalence of Parkinson's disease was noted to increase with age ($\chi^2 = 17.62$, $p = 0.001$).

As to the forms of PD, it was ascertained that the most frequent form was rigidity-tremor (75.2% or 78.8% of cases calculated for European standard population). Its prevalence was 1.00/1000 (95% CI 0.84–1.17). The rigidity form of the disease was rare (13.9% or 13.7% calculated for European standard population), its prevalence being 0.18/1000 (95% CI 0.11–0.25). The tremor form of PD was not frequent (10.9% or 9.5% calculated for European standard population), its prevalence reaching 0.15/1000 (95% CI 0.08–0.21).

Statistically reliable differences were obtained between the rigidity-tremor and rigidity, the rigidity-tremor and tremor forms of the disease ($p < 0.001$), both

in women and men. The difference between the rigidity and tremor forms of PD was statistically reliable only for men ($p < 0.05$).

It was ascertained that the prevalence of Parkinson's disease in Vilnius on January 1, 2005 was 1.32 1.66/1000 in men's group and 1.21/1000 in women's group. Men are more likely to develop Parkinson's disease ($p < 0.05$).

This investigation may be called partially prospective, as data about the new onsets were started to be collected in the beginning of 2004, checked in the middle of 2005, but not all patients were elicited at the same year, so some of them were registered later. For those patients in whom PD started with tremor, this disease was diagnosed after 3–6 months from the onset. For patients with a slower progress, Parkinson's disease was diagnosed even 2 years following the onset, so these patients were included into the list later.

4. Discussion

Parkinson's disease is a chronic disease [14–16,20]. At the beginning its symptoms may be not evident [17–19,32,33]. It is the reason why inflicted persons appeal for medical advice later.

The prevalence of Parkinson's disease in Lithuanian capital Vilnius was investigated using a door-to-door approach, similar to study in central Spain [34,35]. The prevalence of Parkinson's disease in Vilnius (on January 1, 2005) was 1.32/1000 of inhabitants. If compared to other investigations, our data are similar to those obtained in Austria, Scotland, and Italy. A.M. Kuopio (Finland) found the prevalence of PD to be 139–166/100 000. M. Kusumi and K. Nakashima (Japan) have ascertained it to reach 99.5–103.9/100 000 population. M.E. McCann and D.G. LeCouteur in Australia showed that the prevalence of PD was 414/100 000 population [21]. Overall prevalence estimates of Parkinson's disease similar to those reported and in central Spain elderly population. J. Benito-Leon and F. Bermejo-Pareja showed that the prevalence estimates

of Parkinson's disease increased with age, declining at 85 years and over [34,35].

In our study, the prevalence of PD was highest in the 80–89 age group (2.29/1000 population). Investigations conducted by Y. Ben-Shlomo showed that the prevalence of the disease was increasing and reached its peak in the eighth decade [22]. Our data showed the prevalence of PD among men to be 1.66/1000 and among women 1.21/1000 population, so men are more likely to develop PD ($p < 0.05$). The same conclusion was made by other authors such as A.M. Kuopio and R.J. Marttila, R.G. Maldonado, C.M. Tanner and S.M. Goldman [9,10,23]. Z.X. Zhang also points out to the same tendency: he found the prevalence to be 128/100,000 population in men and 78/100 000 in women [12,13].

Results obtained by A.Hofman, M.C. De Rijk and C. Tzourio showed a similar prevalence of the disease for men and women [24,25].

The onset of Parkinson's disease occurs at the age of 50–60 years. The medium age of the onset in our patients was 63.77 ± 0.70 years (64.84 ± 1.07 in men and 62.96 ± 0.93 in women), range 33–89 years. Our data are similar to the data obtained by other authors [12,24,26]. P. Martinez-Martin [27] and S. Sveinsbjornsdottir [28] point to a somewhat lower medium age (61.2–62.2). The medium age of patients during our investigation was 68.48 years (men 69.70 ± 0.97 , women 67.54 ± 0.85 , range 34–90 years).

The mean duration of the disease was 4.98 years (95% CI 4.43–5.53), range 0.5–20 years. Z.X. Zhang points out a similar duration (4.8 years) [13]. This author found quite a wide interval of disease duration – from

1 to 41 years, while C.B. Maskowitz in his study found the mean duration of the disease to be 7 years, ranging from 1 to 18 years [29], P. Martinez-Martin 7.2 ± 4.0 years³⁰, D.A. Bennett 9.2 years [31]. S. Sveinbjornsdottir (Iceland) determined a longer duration of the disease – 9.6 years, range 0 to 35 years [28]. According to her data, the mean age of patients was 69.7 years, range 34 to 94 years. These are similar to our data: mean age 68.48 years, age range 34 to 90 years. Results of her epidemiological study demonstrated disease duration to be twice as long as shown by our indices. These differences appear because health care in Iceland is better.

There are conclusions to be made. The prevalence of Parkinson's disease in Vilnius is 1.32/1000 population (in men's group 1.66, in women's group 1.21). Most patients were aged 70–79, and in this age group the prevalence is 2.88/1000 population. Men are more likely to develop Parkinson's disease ($p < 0.05$). The age of onset of Parkinson's disease is similar in men and women – 63.77 ± 0.70 (men 64.84 ± 1.07 ; women 62.96 ± 0.93). The frequency of separate clinical forms of Parkinson's disease is as follows: rigidity-tremor was found in 76.8% of patients (in men's group 84.0%, in women's group 73.4%); the prevalence of this form is 1.00/1000 population; the rigidity form was present in 13.7% (men 12.3%, women 12.7%), the prevalence 0.18/1000 population; and, the tremor form was observed in 9.5% (men 3.7%, women 13.9%), prevalence 0.15/1000 population.

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