PUBLIC HEALTH RESEARCH

Prevalence and Correlates of Parkinson's Disease among Elderly Patients Attending Neurology Clinic at Serdang Hospital in 2016

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ABSTRACT

Received	07 September 2017
Accepted	11 August 2017
Introduction	Parkinson's disease (PD) is the second most common neurodegenerative disease after Alzheimer's disease (AD) and the most frequent sub-cortical degenerative disease, characterized by universal progressive disorder of the nervous system that affects movement. This cross sectional study aimed to determine the prevalence and correlates of PD among elderly attending the neurology clinic in Serdang Hospital.
Methods	A total of 150 records of patients attended the clinic from January to December 2016 were randomly selected. Data was collected using a proforma form seeking information related to age, gender, race, locality, and presence of comorbidity particularly diabetes mellitus. The data was analysed using the Statistical Package for Social Science (IBM SPSS) version 22.0.
Results	The prevalence of PD among the elderly involved in the study was 34%. Majority of the respondents were aged 60 to 70 years old (54.7%), male (53.3%), Chinese (56.7%), from urban locality (93.0%) and were not diabetic (69.3%). The inferential statistics showed no significant association between all the factors with PD. However, the associations between age and diabetes mellitus with PD were almost significant with p values of 0.07 and 0.08 respectively.
Conclusions	Overall, the prevalence of PD among elderly who attended the neurology clinic in year 2016 was less than half with none of the factors under study were significantly associated with PD. However with bigger sample size, possible significant association may be obtained between age and diabetes mellitus.
Keywords	Prevalence - Correlates - Parkinson's Disease - Elderly.

INTRODUCTION

Parkinson's disease (PD) is a progressive neurological disorder which commonly occurs in the ageing brain. It is associated with impaired and dead neurons in the brain. Being the second most common neurodegenerative disease after Alzheimer's disease (AD), it is the most frequent subcortical degenerative disease. It has been suggested that, PD is not caused by an acceleration of a naturally occurring aging process[1] because the numbers of midbrain catecholaminergic neurons do not significantly decline in very old subjects without PD (aged >80 years). This was also supported by numerous epidemiological studies which reported a decline in the incidence of PD after the age of 70 to 75 years[2] and have also shown that PD is not a frequent primary cause of mortality for those older than 85 years.[3]

According to the Parkinson's Disease Foundation,[4] more than 10 million people worldwide are living with Parkinson's disease. Approximately 60,000 Americans are diagnosed with Parkinson's disease each year, and this number does not reflect the thousands of cases that go undetected.[4] Although incidence of Parkinson's increases with age, but an estimated four percent of people with PD are diagnosed before the age of 50. A systematic review conducted by Hirsch et al.[5] of related studies between 2001 and 2014 revealed rising incidence of PD with age in both men and women. While males had a higher incidence of PD in all age groups, this difference was only statistically significant for those in the age range 60-69 and 70-79 (p < 0.05).

Symptoms of PD begin to appear when about 80% of the related neurons become damaged or impaired. These symptoms will continue and often worsen over time. Persistent body tremor is the most common symptom of PD, especially among the elderly. Tremors are often the first symptom and the least disabling, but often cause the most embarrassment for the patient in public. The slowness of movement that is also common in PD as the disease progresses is called bradykinesia, which is one of the cardinal manifestations of PD. Usually the early symptoms are quite mild and often do not require medication. The physical changes associated with PD impact the most routine habits like getting dressed or rising from a chair. Numerous age-related factors have been advanced as influences on parkinsonism which include overlap between signs of senescence and parkinsonian signs, confounding comorbidities, loss of therapeutic efficacy because of age-related altered pharmacokinetics and pharmacodynamics, and increasing prevalence of non-dopaminergic lesions, causing drug-resistant motor impairment.[6]

Parkinson's disease in the elderly is not easily diagnosed. Neither x-rays nor blood tests reveal the condition. Blood tests and magnetic resonance imaging (MRI) can be used to eliminate other conditions. PD is a treatable disorder and drug therapy can be very gratifying for both the patients and clinicians. However, once the disease progresses, the benefits become less complete and eventually additional problems surface that are poorly or incompletely treatable. The massive variability among patients in how the disease progresses, makes it very difficult to accurately predict how quickly symptoms will worsen, or even which specific symptoms will develop for each patient, which make PD in the elderly a difficult disease to diagnose properly. This study aimed to determine the prevalence and factors that are associated with PD among the elderly people attending the neurology clinic at a public hospital in Malaysia.

METHODS

This study is a cross sectional study using a hospital-based secondary data. A list of elderly patients aged 60 years old and above attended the neurology clinic in Serdang Hospital, Selangor from January to December 2016 was identified. A proforma was developed for the purpose of data collection, seeking information related to the diagnosis of PD, age, gender, ethnicity, locality and presence of other comorbidity specifically diabetes mellitus was developed prior to data collection. The initial proforma contained numerous other factors which include weight. However, due to massive incomplete data reported in the system and further discussion with neurologist incharged, several factors were excluded. Based on the list of names obtained, 150 samples were selected using simple random sampling. The data was entered and analysed using IBM SPSS statistic version 22.0. The significance level was set at p<0.05. Normality testing was conducted for continuous data such as age prior to analysis.

RESULTS

The results revealed only 34% of the respondents were found to have PD. Majority of the respondents were aged 60 to 70 years old (54.7%), male (53.3%), Chinese (56.7%), comes from urban locality (93.3%) and did not have diabetes mellitus (69.3%) as shown in table 1. Meanwhile, table 2 is showing the factors associated with PD among the elderly people who were selected for the study. None of the factors included in the study were significantly associated with PD. However, age and diabetes mellitus were almost having significant association with p values of 0.070 and 0.083 respectively.

Table 1 Socio-demographic characteristics of respondents (N=150)

Factors	n (%)
Age	
60-70	82 (54.7)
71 and above	68 (45.3)
Gender	
Male	80 (53.3)
Female	70 (46.7)
Race	
Malay	47 (31.3)
Chinese	85 (56.7)
Indian	18 (12.0)
Locality	
Urban	140 (93.3)
Rural	10 (6.7)
Diabetes Mellitus	
Yes	46 (30.7)
No	104 (69.3)

Table 2 Factors associated with Parkinson's Disease (N=150)

Factors	Parkinson's disease (%)		P-value
	Yes	No	χ^2
Age			
60-70	23 (27.7)	60 (72.3)	0.070
71 and above	28 (41.8)	39 (58.2)	
Gender			
Male	28 (35.0)	52 (65.0)	0.782
Female	23 (32.9)	47 (67.1)	
Race			
Malay	15 (31.9)	32 (68.1)	0.730
Chinese	31 (36.5)	54 (63.5)	
Indian	5 (27.8)	13 (72.2)	
Locality			
Urban	47 (33.6)	93 (66.4)	0.735
Rural	4 (40.0)	6 (60.0)	
Diabetes mellitus			
Yes	11 (23.9)	35 (76.1)	0.083
No	40 (38.5)	64 (61.5)	

DISCUSSION

Characterized by body tremors, stiffness and difficulty moving, PD is a neurological disease that is often difficult to diagnose in the elderly. The prevalence estimates of PD vary widely across studies and countries and are inconsistent in some countries that lead to the conduction of systematic reviews of prevalence of PD. The findings of this study revealed that among the elderly patients who attended the neurology clinic for various reasons, 34% of them were found to have PD. A lower prevalence may be expected if the study was conducted among the community dwelling elderly rather that in a hospital setting. Several previous studies reported lower prevalence of PD and minimal difference between male and female. A study by Tison et al.[7] on the prevalence of PD among 3149 people over age 65 reported a very low prevalence of only 1.4%, with no significant difference between older men and women. Similarly, another study which was conducted about the same time among general elderly population in the Netherlands also reported a low prevalence of PD which was 1.4% (1.2% for men, 1.5% for women).[8] However, these two studies were conducted more than 20 years ago and the comparable recent prevalence maybe more accurate. Meanwhile, there was also studies reported high prevalence of PD. A recent study among the Navajo people living in the Navajo nation on incidence and prevalence of PD revealed a high prevalence of PD among the general population with 524 of the Navajo people with median age-at-onset of 74.0 years were diagnosed with PD during the study period, yielding an average annual crude incidence rate of 22.5/100,000.[9]

This study also found that, although none of the factors were significantly associated with PD, significant relationship could be obtained between age and presence of diabetes mellitus if a bigger sample size is used. The increase in the prevalence of PD with age has been reported in many studies. Van de Vijver et al.[10] in their study which was also using secondary data from the pharmacy records involving residents of six Dutch cities revealed, the unadjusted prevalence (per 100,000) for those aged 55-64 years was 111, 65-74 years 598, 75-84 years 1551 and for persons aged 85 years and older 1847, which indicate a positive linear relationship between PD and age. Another similar finding was also shown in a study by De Rijk et al.[8] with the prevalence of 0.3% for those aged 55 to 64 years, 1.0% for those 65 to 74, 3.1% for those 75 to 84, and 4.3% for those 85 to 94. The corresponding age-specific figures for men were 0.4%, 1.2%, 2.7%, and 3.0%, and for women, 0.2%, 0.8%, 3.4%, and 4.8%.[8] Additionally, in a collaborative study involving 5 European populations also reported that the prevalence of parkinsonism and PD increased with age in all five surveys for both men and women, with no decrease at higher ages. This suggests that the prevalence, and probably also the incidence, of PD continues to increase beyond the age 85 or 90 years.[11]

As for the presence of diabetes mellitus, an almost significant relationship was also obtained from this study. Changes in human behaviour and lifestyle have globally increased the prevalence of diabetes mellitus (DM) which closely related to mitochondrial function. Many diseases of mitochondrial dysfunction affect more than 1 system in the human body, and commonly affect organs that require a lot of energy, including the heart, skeletal muscle, and brain. A study by Schapira[12] on specific gene mutations that cause PD has reinforced the relevance of oxidative stress and mitochondrial dysfunction in the familial and the sporadic forms of the disease. The result of the study indicates that the PD associated proteins are either mitochondrial proteins or associated with mitochondria, and all interface with the pathways of oxidative stress and free radical damage. Many studies in the literature indicate that PD and DM, both age-related chronic diseases, share remarkably similar pathways of mitochondrial dysfunction and suggest the association of DM with PD.[13-14] The relationship between DM and PD was inconsistent with several epidemiological reports. A meta-analysis study from 14 reports and concluded that evidence from case-control studies suggested that diabetic individuals may have a decreased incidence of PD despite significant heterogeneity.[15] Meanwhile, in the other meta-analysis exploring this line of question including cohort and case-control studies, the pooled results of 4 cohort studies with large sample size demonstrated that

diabetes was associated with a significant 37% increased risk of PD.[16] To clarify the role of type 2 DM on the risk of PD incidence, a large cohort study of Chinese patients with and without type 2 DM in Taiwan was conducted by Yang et al.[17] which revealed DM increased the risk of PD during a mean follow-up of 7.3 years.

CONCLUSION
This study revealed a high prevalence of PD among elderly attending the neurology clinic. However, a comparable study among the community dwelling elderly would be necessary. Further study should be conducted to explore the relationship between age and diabetes mellitus with PD among the Malaysian population. Among the limitations of this study that should be taken into future considerations are the small sample size. Another limitation is the use of cross sectional study design which does not take into account the temporal effect.

ACKNOWLEDGEMENT

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