Original Article

Predictors and Level of Knowledge Regarding Parkinson's Disease among Patients: A Cross-sectional Study from Thailand

Abstract

Background: Parkinson's disease (PD) is a neurodegenerative disorder that results in gradual decline of motor, autonomic, and neuropsychiatric functions of the patient. Knowledge and factors responsible for Parkinson's disease (PD) are important among patients that could positively affect their attitude and perceptions. This study was conducted to determine the factors influencing and level of the knowledge regarding Parkinson's disease in Thailand. **Methods:** This cross-sectional study was conducted on 125 patients admitted in King Chulalongkorn Memorial Hospital Bangkok, Thailand. Sociodemographic variables and clinical characteristics were collected as predictors of knowledge, treatment, and self-care for PD. A validated, piloted, pretested tool was used for data collection. Multiple linear regressions were used to find the most influencing predictor of knowledge about PD. The study was approved by the Ethical Board of Chulalongkorn University, Thailand. **Results:** The level of education was found to be the most significant ($P = 0.005$) predictor of PD knowledge. PD patients with high education had significantly higher knowledge scores than those with low education in all aspects of disease ($P = 0.041$), treatment ($P = 0.014$), and self-care ($P = 0.011$). PD knowledge was poor in variables such as levodopa (62%), nonmotor symptoms (54%), and stem cell transplantation (40%), respectively. **Conclusion:** The study results conclude that educational level is the most important predictor of knowledge about Parkinson's disease.

Keywords: *Awareness, cure, education, knowledge level, misconception and determinants of Parkinson, motor disease awareness, Parkinson's disease*

Pramon Viwattanakulvanid, Ratana Somrongthong, Muskan Vankwani[1], Kavita FN[2], Ramesh Kumar[3]

College of Public Health Sciences, Chulalongkorn University, Bangkok, Thailand, [1]Second Year MBBS, Dow International Medical College Karachi, Pakistan, [2]Civil Hospital, Mirpurkhas, Sindh, Pakistan, [3]Health Services Academy, Islamabad, Pakistan

Introduction

Parkinson's disease (PD) is one of the progressive neurodegenerative disorders causing disturbance in human motor function that results in abnormal gait. This disease can affect approximately 1–2% of elderly people over 60 years of age.[1] The characteristics of the disease include bradykinesia, stiffness, tremor and impaired balance, sleep disturbances, pain, fatigue, and cognitive impairment.[2] Around 60,000 PD cases have been reported between 2008 and 2011 in Thailand.[3] However, the estimated direct costs for PD treatment in Thailand were reported to be 860 and 963, US $ respectively.[4] The lack of knowledge about PD among the patients is a result of limited access to and availability of health facilities providing services and absence of special clinic for Parkinson in Thailand.[5]

The disease is a treatable but not curable and requires regular symptomatic care as per the needs. Hence, proper knowledge about the disease could prevent severe complications; the lack of proper knowledge poses a barrier in providing proper treatment and care for patients with PD[6] and affects the health and therapeutic outcomes. This lack of knowledge influences the level of disease awareness and its management, which in turn influences the attitude, misconceptions, and perceptions about the disease and the expectations from therapy.[7] Proper knowledge about medication and self-care such as exercise and motor training can help regain balance, prevent falls, and improve the quality of lives in patients.[8] Therefore, self-care of and medication adherence by the patients are essential factors for holistic care. The lack of adequate knowledge regarding prevention and care related to PD could create a burden on the health system due to its late complications among patients with Parkinson (PwP).[6]

There was evidence regarding knowledge gap among PD patients in a few Asian countries. A study in China reported that the patients lack knowledge about the

Address for correspondence:
Dr. Ramesh Kumar,
Health Services Academy,
Chakshahzad, Islamabad,
Islamabad Capital Territory,
Pakistan.
E-mail: drramesh1978@gmail.com

How to cite this article: Viwattanakulvanid P, Somrongthong R, Vankwani M, Kavita FN, Kumar R. Predictors and level of knowledge regarding Parkinson's disease among patients: A cross sectional study from Thailand. Int J Prev Med 2020;11:25.

etiology, side effects of PD medications, use of levodopa, and surgical treatment.[9] In Malaysia, the PD knowledge survey results showed that patients had misconceptions about the cure and all patients undergo tremors without the knowledge about nonmotor symptoms (NMS).[7] In India, the low scores illustrated low knowledge among PwP about the surgery and biochemical abnormalities of PD.[10] To fill the knowledge gaps among PwP in Thailand, healthcare providers need to understand the factors that affect the knowledge of patients with Parkinson (PwP). The previous studies[11-13] have suggested that the education level, income, age, gender and types of disease were associated with the knowledge of patients. Hence, it is imperative to determine the factors and level of the knowledge among Parkinson's disease in Thailand.

Methods

A cross-sectional study was conducted by including the patients diagnosed with PD and subjecting them to Thai Mental State Examination (TMSE), a standard screening tool for the evaluation of cognitive status in the clinical settings, developed from the original version of MMSE[1]. The minimum cut-off scores are 24 out of 30 points used for the select patients with suspected cognitive impairment or dementia[2].

In addition, those patients with auditory and visual hallucinations will be excluded. We used to collect the data based on our outpatient department (OPD) records which have the MMSE scores and the diagnosis of auditory and visual hallucinations indicated by the neurologists at the PD clinic. The sample size calculation for multiple regression analysis was calculated using G*Power program with the medium effect size = 0.15, power = 0.8, number of independent variables = 7, α = 0.05. A medium effect size estimates the average size of the observed effect in many field and is widely used if there is no available research to assess the effect size for the population.[14] Based on the calculation, the required sample size was 103. To cover the patient dropout rate, 125 patients were finally included. Ethics approval for the study was obtained from the faculty of Medicine, Chulalongkorn University.

The Parkinson's disease knowledge questions were divided into three parts; disease, treatment, and selfcare knowledge. Each part consisted of 5 questions with yes and no option. Hoehn and Yahr (HY) stage is used to assess the stage of PD in motor decline.[15] The Parkinson's disease knowledge questionnaire was piloted and pretested on 10 patients in a similar kind of population living in adjacent area and modified accordingly.[7,16]

---

[1]Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975;12:189-98.

[2]Train the Brain Forum Committee. Thai mental state examination (TMSE). Siriraj Hosp Gaz 1993;45:359-74.

Statistical analysis

Descriptive statistics of frequencies and percentages were used and Multiple linear regression analysis was used to find the influential factors of demographic variables and clinical characteristic variables on Parkinson's disease knowledge. The tolerance and variance inflation factor (VIF) values were calculated to check for multicollinearity, which means two or more predictors in the multiple linear regression are highly correlated instead of explaining the dependent variable. If VIF value >10 or by tolerance <1.0, it indicates problems with multicollinearity.[3]

Group differences in Parkinson's disease knowledge scores were analyzed using independent-*t* test. Association between Parkinson's disease knowledge and the significant influencing factors in each item in questionnaire were performed by Chi-square and Fisher's exact test and Spearman correlation, a nonparametric statistic, was used to evaluate relationships between two variables when the violation of normal distribution data occurs. All tests were two tailed with a significance level of 0.05.

Results

There were 125 patients with the mean age (58.4 ± 8.96, ± SD), range 37–81. More than half (54%) of the participants were female and their average Hoehn and Yahr stage (HY stage) was (2.24 ± 0.64) with 1–3. Sixteen percent of PwP had family income lower than 300 US $ per month and 55.2% of PwP were unemployed. The disease duration of PD was 8.0 ± 4.9 years. Forty-two percent of PwP had high education level and 58% of PwP had low education level [Table 1].

Multiple regression analysis shows that the education level was a significant predictor of Parkinson's disease knowledge and there were no multicollinearity problems among predictors measured by the Variance Inflation Factor (VIF) and Tolerance analysis as illustrated in Table 2.

According to the top three most wrong answers of Parkinson's disease knowledge questionnaires and total average scores of Parkinson's disease knowledge in Table 3, more than half of PwP misunderstood about levodopa side effect handling (62.4%) and dementia as nonmotor symptoms in PD (53.6%). In addition, 40% of PwP had a misconception about PD treatment with stem cell transplantation (40.0%). The average scores of all PwP with respect to (mean ± SD) overall knowledge about the disease, knowledge about Parkinson's, knowledge about treatment, and knowledge about self-care, respectively are: 21.89 ± 2.64, 5.60 ± 1.05, 8.73 ± 1.75, and 7.74 ± 0.58.

Regarding the comparison of correct responses between subgroups, PwP with low education had significantly

---

[3]Hair JF Jr., Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. 7th ed. Pearson New International Edition ed. Harlow: Pearson Education Limited; 2014.

Table 1: Demographic variables and clinical characteristics variables of PwP related to Parkinson's disease knowledge scores (*n*=125)

Group	*n* (%)	Total knowledge scores (Mean±SD)	*r*	*P*
Age (Mean±SD)	58.4±8.96	21.9±2.64	-0.02	0.872[#]
Gender				0.813[Ω]
Male	58 (46.4)	22±2.46		
Female	67 (53.6)	21.8±2.81		
Income				0.083[Ω]
Low income	20 (16)	21±2.98		
High income	105 (84)	22.1±2.55		
Education				0.001*,[Ω]
High education level (Bachelor's Degree or above)	53 (42.4)	22.6±2.18		
Low education level (Below Bachelor's Degree)	72 (57.6)	21±2.94		
Employment				0.985[Ω]
Employment	56 (44.8)	22±2.60		
Unemployment	69 (55.2)	21.9±2.71		
HY stage (Mean±SD)	2.2±0.64	21.9±2.64	-0.08	0.349[#]
Disease duration (Mean±SD)	8.0±4.86	21.9±2.64	-0.05	0.557[#]

*Statistically significant (*P*<0.05) **statistically significant (*P*<0.001), [#]Spearman's correlation, [Ω]independent *t*-test

Table 2: Multiple regression analysis to identify the predictors of Parkinson's disease knowledge (*n*=125)

Model	Unstandardized Coefficient	Standardized Coefficient	*P*	Tolerance	VIF
Constant	20.898				
Age	0.001	0.004	0.972	0.685	1.460
Gender	0.128	0.024	0.788	0.950	1.053
Income	0.411	0.057	0.543	0.872	1.147
Education	1.481	0.278	**0.004***	0.833	1.200
Employment	-0.031	-0.006	0.955	0.705	1.419
HY stage	-0.254	-0.061	0.528	0.819	1.221
Disease duration	0.031	0.057	0.550	0.843	1.186

R=0.316, *R*²=0.100, SE=2.58. *Statistically significant (*P*<0.05), Bold values are exact *P* value is 0.004

Table 3: Comparison of PD knowledge among PwP with high education (Bachelor's Degree or above) vs. low education (below Bachelor's Degree) who answered correctly

Parkinson's disease knowledge (Mean±SD)	Percentage answered incorrectly	Percentage answered correctly		*P*
	Total PwP (*n*=125)	High Education (*n*=72)	Low Education (*n*=53)	
Knowledge about Parkinson's disease				
Disease knowledge	5.60±1.05	5.76±1.00	5.38±1.08	*P*=0.041[g]
Knowledge about treatment				
Treatment knowledge	8.73±1.75	9.07±1.50	8.26±1.97	*P*=0.014[g]
Knowledge about self-care				
Self-care knowledge	7.74±0.58	7.74±0.58	7.32±1.05	*P*=0.011[g]
Overall Parkinson's disease knowledge — Range (0-26)	21.89±2.64	22.51±2.18	20.96±2.94	*P*=0.001[g]

[g]Independent *t* tests were performed comparing scores between high education and low education. *Statistically significant at *P*<0.05

lower knowledge than PwP with low education in every aspect. Regarding disease knowledge, PwP with low education had a misconception about the relationship between disabilities and PD symptoms (*P* = 0.026). With respect to treatment knowledge, PwP with low education did not understand about protein food interaction with levodopa (*P* = 0.008), the appropriate time to take PD medications (*P* = 0.013), self-adjustment of PD medications (*P* = 0.003), and informing their alternative treatment to

the doctors (*P* = 0.003). Regarding self-care knowledge, PwP misunderstood about vocal exercises for PD stuttering (*P* = 0.002).

Discussion

The findings of our study found that the educational background of PwP had an impact on the level of knowledge about PD. The relationship between education on health knowledge were also found in the previous studies.[11-13]

PwP with high education had higher knowledge than PwP with low education in terms of disease knowledge, treatment knowledge, and self-care knowledge. Nausea and vomiting are the common side effects of levodopa.[6] This problem can be solved with the anti-sickness medicine or gradual dosage adjustment of levodopa. PwP should not stop taking levodopa immediately without informing their doctors as it may cause serious side effects such as being unable to move or having a breathing difficulties.[6,7,17] Lack of knowledge about levodopa use, especially about protein consumption and correct time of taking levodopa, was found in PwP in China.[9] PwP must carefully take daily PD medications with precise dosing schedules. Poor knowledge of PD can cause noncompliance and worsen PD symptoms.[18]

Regarding the use of herbal medicines, some PwP with low education believed that herbal medicines are safe and it was not necessary to inform the doctors. The prevalence of traditional, complementary, and alternative medicine use for chronic diseases in Thailand and neighboring countries such as Vietnam and Cambodia was high.[19] The survey of herbal medicine use among hospital patients reported that most patients received the knowledge from mass media and some information from the media was not appropriate for patients.[20]

Secondly, nonmotor symptoms in PD have been overlooked and PwP with nonmotor symptoms take long time to be diagnosed.[21] The PD knowledge study in Malaysia found that PwP also recognized tremor as the main feature of PD compared to nonmotor symptoms in PD.[7] In our survey, half of PwP irrespective of different educational levels did not understand dementia in PD. Dementia is one of the nonmotor symptoms and a common occurrence in PD. About 40 percent of PwP suffer from dementia in cross-sectional studies.[22] PwP have a sixfold increased risk for dementia and the average time from onset of PD to developing dementia is about 10 years.[23] Dementia can lead to an additional and essential burden of functional impairment linked to significant cognitive decline and worse quality of life.[24] In addition, most PwP incorrectly believed that the new treatments such as stem cell transplantation can cure PD. The misconceptions of stem cell transplantation were possibly related to the improper regulation controls and misleading advertisements.[25] In addition, Thai FDA and Thai Medical Council must strictly regulate the advertising of stem cell therapies and control the malpractice of some licensed physicians and protect patients.[26] This was a hospital-based study and hence its findings cannot be generalized across the country.

Conclusion

The study revealed that the knowledge regarding PD was poor and educational level is an important factor in predicting knowledge about Parkinson's disease. However, it is recommended that health education and awareness should be given to patients suffering from PD and should be educated during the time of diagnosis.

Limitation of the study

There is a limitation of generalization to the whole populations due to the selection of only one public hospital. Another possible limitation of the study was the selection of variables such as sociodemographic and severity of disease, which might not be powerful explanatory variables on the outcomes of the study. However, although the report of R-squared was very low, the results were still meaningful to draw important conclusions about the changes in the predictor values along with the changes in the response value.

Data availability

Data used to support the findings of this study may be released upon request to the Ethical Committee of Chulalongkorn University Thailand, who can be contacted at pramon76@hotmail.com.

Author contributions

P.V performed the literature search and conceptualized the study. Data analysis and interpretation of multilevel results were done by M.V. The manuscript was drafted by R.K and reviewed by K.P and R.S. All the authors were involved in revision and editing of the draft. All authors critically reviewed the final manuscript and approved the draft for final submission.

Conflicts of interest

There are no conflicts of interest.

References

1. Olanow CW, Stern MB, Sethi K. The scientific and clinical basis for the treatment of Parkinson disease (2009). Neurology 2009;72 (21 Suppl 4):S1-136.

2. Bhidayasiri R, Truong DD. Therapeutic strategices for nonmotor symptoms in early Parkinson's disease: The case for a higher priority and stronger evidence. Parkinsonism Related Disord 2012;18S1:s110-3.

3. Bhidayasiri R, Wannachai N, Limpabandhu S, Choeytim S, Suchonwanich Y, Tananyakul S, *et al*. A national registry to determine the distribution and prevalence of Parkinson's disease in Thailand: Implications of urbanization and pesticides as risk factors for Parkinson's disease. Neuroepidemiology 2011;37:222-30.

4. Techakehakij W, Kanyamee P. Direct costs of Parkinson's disease

at Suratthani Central Hospital: A retrospective study. J Health Sci 2016;25:69-75.

5. Bhidayasiri R, Saksornchai K, Kaewwilai L, Phanthumchinda K. A census of movement disorders at a Thai university hospital. J Neurol Sci 2011;301:31-4.

6. Bhidayasiri R, Brenden N, Viwattanakulvanid P, Jitkritsadakul O, Tabucanon R, Jagota P, *et al*. Identifying gaps in knowledge about Parkinson disease among medical professionals in Thailand. Neurology 2014;82:2238-40.

7. Tan AH, Tan CT, Marras C, Loh KW, Wye Ho NW, Lim QH, *et al*. Knowledge of Parkinson's disease in a multiethnic urban Asian setting. J Parkinson's Dis 2015;5:865-79.

8. Youn J, Oh E, Park J, Park S, Kim JS, Jang W. Public awareness and knowledge about Parkinson's disease: A national population based survey in South Korea. Neuroepidemiology 2016;47:117-23.

9. Li J, Chen D, Song W, Chen K, Cao B, Huang R, *et al*. Survey on general knowledge on Parkinson's disease in patients with Parkinson's disease and current clinical practice for Parkinson's disease among general neurologists from Southwest China. Clin Neurol Neurosurg 2014;118:16-20.

10. Yadav R, Shukla G, Goyal V, Singh S, Behari M. Knowledge of Parkinson's disease among patients and caregivers attending movement disorder clinic at a tertiary care centre in north India. Ann Indian Acad Neurol 2012;15:294-6.

11. Hooja N, Singh N, Mital P, Bhargava S, Sharma A, Kumawat B. Relationship of education and socio-economic status with knowledge about abnormal uterine bleeding and its risk factors. Int J Community Med Public Health 2016;3. doi: 10.18203/2394-6040.ijcmph 20162575.

12. Mondal MN, Nazrul HM, Chowdhury MR, Howard J. Socio-demographic factors affecting knowledge level of Tuberculosis patients in Rajshahi City, Bangladesh. Afr Health Sci 2014;14:855-65.

13. Quinlan P, Price KO, Magid SK, Lyman S, Mandl LA, Stone PW. The relationship among health literacy, health knowledge, and adherence to treatment in patients with rheumatoid arthritis. HSS J 2013;9:42-9.

14. Cohen J. A power primer. Psychol Bull 1992;112:155-9.

15. Ronald F. Pfeiffer, Zbigniew K. Wszolek, Manuchair Ebadi. Parkinson's Disease. 2nd ed. CRC Press; 2012.

16. Bhidayasiri R, editor. Clinical Practice Guideline for Diagnosis and Management of Parkinson's Disease: Chulalongkorn Center of Excellence for Parkinson's Disease and Related Disorders. King Chulalongkorn Memorial Hospital, The Thai Red Cross Society; 2010.

17. National Institute of Health N. Parkinson's Disease: Medications. 2016.

18. Malek N, Grosset DG. Medication adherence in patients with Parkinson's disease. CNS Drugs 2015;29:47-53.

19. Peltzer K, Pengpid S, Puckpinyo A, Yi S, Vu Anh L. The utilization of traditional, complementary and alternative medicine for non-communicable diseases and mental disorders in health care patients in Cambodia, Thailand and Vietnam. BMC Complement Altern Med 2016;16:92.

20. Satyapan N, Patarakitvanit S, Temboonkiet S, Vudhironarit T, Tankanitlert J. Herbal medicine: Affecting factors and prevalence of use among Thai population in Bangkok. J Med Assoc Thai 2010;93(Suppl 6):S139-44.

21. O'Sullivan SS, Williams DR, Gallagher DA, Massey LA, Silveira-Moriyama L, Lees AJ. Nonmotor symptoms as presenting complaints in Parkinson's disease: A clinicopathological study. Mov Disord 2008;23:101-6.

22. Aarsland D, Andersen K, Larsen JP, Lolk A, Kragh-Sorensen P. Prevalence and characteristics of dementia in Parkinson disease: An 8-year prospective study. Arch Neurol 2003;60:387-92.

23. Pagonabarraga J, Kulisevsky J. Cognitive impairment and dementia in Parkinson's disease. Neurobiol Dis 2012;46:590-6.

24. Meireles J, Massano J. Cognitive impairment and dementia in Parkinson's disease: Clinical features, diagnosis, and management. Front Neurol 2012;3:88.

25. Olanow CW, Isacson O. Stem cells for Parkinson's disease: Advancing science but protecting patients. Mov Disorder 2012;27:1475-7.

26. Kiatpongsan S, Sipp D. Monitoring and regulating offshore stem cell clinics. Science 2009;323:1564-5.