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Research Article

Prevalence of Impulse Control Disorders among Adult Filipino Patients with Idiopathic Parkinson's Disease seen at Jose R. Reyes Memorial Medical Center

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Abstract

Background:

Impulse Control Disorders (ICDs) are characterized as pathologicalbehavioral patterns of excess impulsivity which may result as part of the non-motor complications of Parkinson's disease (PD). These significantly affect the patient's overall quality of life and have impact on their care givers, as well. Currently, the prevalence of ICDs among adult Filipino patients with Parkinson's disease is unknown and less reported.

Objectives:

The study is intended to determine the prevalence of ICDs and its severityamong adult Filipino patients with idiopathic Parkinson's disease seen at Jose R. Reyes Memorial Medical Center. Specifically, this study will identify risk factors and the clinical correlates to these patients.

Methods:

Adult Filipino patients diagnosed withidiopathic Parkinson's diseasewhowere seen at the outpatient department from March 2015 – September 2015 are screened for the study. The Modified Hoehn and Yahr staging was utilized to determine the stage of PD. With approval from the author, the Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease-Rating Scale (QUIP-RS) was used for detecting the presence of ICDs and corresponding severity.

Results:

We were able to examine 66 patients (31 males and 35 females) with idiopathic Parkinson disease. Majority of the patients manifested with Tremor Dominant (50%) subtype, followed by Early Disease Onset (34.8%), and Non-Tremor Dominant (15.2%). Sixteen (16) out of 66 patients (24.2%) have ICD symptoms with the following incidence rates: hobbyism/ punding 56.25%, compulsive eating 50%, hypersexuality 18.75%, compulsive shopping 18.75, Dopamine dysregulation syndrome 18.75%, and gambling 12.5%. Overall average QUIP-RS score is 5.42. There is significant association of PD duration with occurrence of ICD symptoms; the longer the PD duration, the higher risk of having ICD symptoms (x^2 20.41; p = 0.026). Patients with higher mean modified Hoehn and Yahr stage (2.66±0.94), t 2.735, df 64, p 0.008, have much higher incidence of ICD symptoms.

Conclusion:

Filipino patients with idiopathic Parkinson disease who are majority on levodopa + carbidopa therapy may develop impulse control disorders (ICDs). Other contributory factors in development of ICDs include longer duration of PD and higher mean Modified Hoehn and Yahr stage.

Keywords:
Parkinson's disease; impulse control disorders; levodopa; dopamine agonist

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Introduction

Parkinson's disease is a chronic, progressive, neurodegenerative disease characterized by loss of dopaminergic pigmented cells in the substantia nigra, locus ceruleus, and dorsal motor nucleus of the vagus[1]. Core features of the disease are a tetrad of bradykinesia, rigidity, resting tremors and postural instability. The onset of symptoms usually starts between ages 45 and 70 with peak incidence in the sixth decade and male preponderance[1].

The following are the clinical subtypes of PD: 1. early disease onset (EDO): below age 55; 2. Tremor dominant (TD): onset at age 55 and above initially presenting with rest tremor over bradykinesia and rigidity; 3. Non-tremor dominant (NTD) or the akinetic rigid type: onset at age 55 and above with bradykinesia and with or without mild rest tremor; and 4. Rapid disease progression without dementia (RDP): death occurred in the first 10 years of symptoms irrespective of age [8].

Non-motor symptoms (NMS) of Parkinson's disease are uncommonly recognized and often missed in neurologic consultations. These undertreated symptoms cause major disability for Parkinson patients. These symptoms occur at all stages of PD and are common with disease progression in severity and

duration[3]. The most reported disabling symptoms of Parkinson's disease are postural instability, dementia, insomnia, and drooling of saliva [3].

Impulse control disorders (ICDs) are pathological behavioral patterns which include hypersexuality, compulsive eating or shopping, pathological gambling, repetitive mechanical activities (punding) or excessive compulsive overuse of dopaminergic drugs (dopamine dysregulation syndrome – DDS) that occurs in 15-20% of Parkinson patients[6]. These can be associated with the goal of being rewarded whether through experiencing pleasure and/or through material gain. This can be explained by the result of the damaged dopaminergic transmission with the reward-seeking behavior center in the brain (amygdala and nucleus accumbens) caused by PD pathology or the dopaminergic treatment itself. The hypersensitization of the ventral striatal circuitry due to enhanced ventral striatal dopamine release may be another pathological mechanism. Recent studies have demonstrated that the use of levodopa and dopamine agonists (particularly pramipexole), early onset of PD, substance abuse, depression, higher novelty-seeking personality traits and being male, promote higher risk of developing ICDs. Hypersexuality and pathologic gambling are the most common ICDs to occur [5,6,7].

Impulse control disorders (ICDs) significantly affect the overall quality of life of Parkinson's disease patients especially on the psychological and socioeconomic aspect. Currently, the prevalence of ICDs among adult Filipinos with idiopathic PD is unknown and less reported.

Objectives of the Study

General Objective: The study is intended to determine the prevalence of Impulse Control Disorders (ICDs) and their severity among adult Filipino patients with idiopathic Parkinson's disease seen at Jose R. Reyes Memorial Medical Center.

Specific Objectives:

This study will identify risk factors and clinical correlates to these patients.

Methodology

All consecutive adult Filipino patients with idiopathic PD seen from March 2015 – September 2015 at the outpatient department were screened for the study. A Movement Disorder specialist verified the diagnosis of PD using the UK Brain Bank diagnostic criteria.

A baseline neurologic examination of the subjects was done. Those subjects with cognitive dysfunction, psychiatric illness, and current medical conditions who are unable to answer the questionnaires and give consent were excluded from the study. The following variables for correlation with ICDs were considered in the study: Age, Sex, Duration and stage of illness, subtype of PD, type of anti-Parkinson medications, use of antipsychotics and antidepressants, and the treatment duration prior to onset of ICD symptoms.

We used the Questionnaire for Impulsive-Compulsive Disorders Questionnaire in Parkinson's Disease-Rating Scale (QUIP-RS) for screening the subjects. It is a validated questionnaire for detecting ICD symptoms and corresponding severity. It contains 7 sections on pathological gambling, hypersexuality, compulsive eating, compulsive buying, punding, hobbyism, and Parkinson's disease medication use (Dopamine Dysregulation Syndrome)[11].

Study Subjects

A. Inclusion Criteria

1. Adult Filipino patients diagnosed with idiopathic Parkinson's disease

2. Subjects who can comprehend and answer the questionnaires to be given by the investigator

3. Subjects who accomplished the written consent form

B. Exclusion Criteria

1. Subjects with a severe medical condition of any type that may affect their participation or put them at special risk (i.e., dementia or cognitive problems, metabolic encephalopathies, etc.)
2. Subjects with current opportunistic infection
3. Subjects with disability that may prevent the him from completing the requirements for the research study (e.g. blindness, deafness, weakness of the dominant hand, etc.)
4. Subjects with known psychiatric illness (e.g. Schizophrenia)

Assessment Instruments

The Modified Hoehn and Yahr staging of Parkinson's disease was done. With approval from the author, Dr. Daniel Weintraub, the QUIP-RS was used.

Statistical Analysis

A. Sample Size Calculation

There are around 10 idiopathic PD patients seen monthly in the outpatient department of our institution. A minimum of 60 (N=~70, from March-September 2015) subjects will be included in this study, which was calculated as follows:

$n= (Z\ score)^2(SD)\ (1\text{-}SD)\ /(margin\ of\ error)^2$

where: Z score corresponds to confidence level (95%) =1.96 SD, standard deviation margin of error set at 5%

B. Data Analysis

Description of data will be presented in percentages, means, and standard deviation. Statistical SPSS 21.0 software was used to analyse the data. For determining the correlation of variables with impulse control disorders, the Pearson Chi-square test was utilized. An independent sample T test was used to demonstrate association of ICD symptoms with the mean Modified Hoehn and Yahr stage.

Results

Sixty-six (66) adult patients (31 males and 35 females) diagnosed with idiopathic Parkinson disease were examined. These included patients with mean age of 63.33±10.01, mean duration of PD for 4.39±2.54 years, and mean modified Hoehn and Yahr stage of 2.13±0.93. The most common Parkinson disease subtype was Tremor Dominant (TD) with 48.5% prevalence. Majority of the subjects were on levodopa + carbidopa drug regimen (48.5%) followed by combination of levodopa + carbidopa and anticholinergic agents (31.8%).

Using the Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease-Rating Scale (QUIP-RS), sixteen (16) out of 66 patients (24.2%) have ICD symptoms with the following incidence rates: hobbyism/ punding 56.25%, compulsive eating 50%, hypersexuality 18.75%, compulsive shopping 18.75, Dopamine dysregulation syndrome 18.75%, and gambling 12.5%. The overall average QUIP-RS score is 5.42 which may be interpreted as mild.

Analysis of risk factors versus occurrence of ICD symptoms revealed that there is no significant association of age with the development of ICD symptoms (x^2 34.22; $p = 0.231$). The gender distribution is the same across categories of ICD (x^2 0.078; $p = 0.78$).

There is significant difference in the distribution of PD subtypes in relation to ICD symptoms with TD subtype being the most predominant (x^2 5.78; $p = 0.056$). Occurrence of ICD symptoms did not vary significantly across the different drug regimens for PD (x^2 12.59; $p = 0.127$). There is significant association of PD duration with occurrence of ICD symptoms; the longer the PD duration, the higher the risk of developing ICD symptoms (x^2 20.41; $p = 0.026$). Association of risk factors with individual ICD symptoms (Gender, PD subtype and PD meds) did not have any significant results except in PD meds vs. gambling (Table 1).

Table 1. Association of Gender, PD subtype, and type of PD medications with ICD symptoms

		Gambling	Hypersexuality	Eating	Shopping	Hobbyism/Punding	DDS
Gender	Chi-square	2.329	0.49	2.872	2.784	0.027	0.49
	Df	1	1	1	1	1	1
	Sig.	0.127	0.484	0.09	0.095	0.87	0.484
PD subtype	Chi- square	2.065	3.148	5.273	3.148	2.522	3.148
	Df	2	2	2	2	2	2
	Sig.	0.356	0.207	0.072	0.207	0.283	0.207
PD Medications	Chi-square	33.589	11.262	11.642	3.339	4.097	10.199
	Df	8	8	8	8	8	8
	Sig.	0	.187[a,b]	.168[a,b]	0.911	0.848	0.251

Table 2. Association of PD duration with ICD Symptoms

Pearson Chi-Square Tests							
		Gambling	Hypersexuality	Eating	Shopping	Hobbyism/ Punding	DDS
Duration PD	Chi- square	10.227	10.154	12.039	9.194	10.267	22.786
	df	10	10	10	10	10	10
	Sig.	0.421	0.427	0.282	0.514	0.417	0.012

Analysis of the relationship of risk factors to occurrence of ICD symptoms did not produce any homogenous conclusive results when the entire population was taken into account. There is a significant association of PD duration and DDS (x2 22.79; p = 0.012) (Table 2). Longer duration of PD likely predisposes to the development of DDS.

An independent sample T test was used to demonstrate the association of mean H&Y stage with occurrence of ICD symptoms. Patients with higher mean modified Hoehn and Yahr stage (2.66±0.94), t 2.735, df 64, p 0.008, have much higher incidence of ICD symptoms (Table 4).

Table 3. Mean Modified Hoehn & Yahr stage in patients with and without ICD symptoms

Group Statistics					
	ICD	N	Mean	Std. Deviation	Std. Error Mean
H&Y	Yes	16	2.6563	0.94373	0.23593
Stage	No	50	1.96	0.86803	0.12276

Table 4. Association of mean Modified Hoehn & Yahr stage with ICD symptoms

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the difference	
									Lower	Upper
H&Y	Equal variances assumed	0.926	0.34	2.735	64	0.008	0.69625	0.25458	0.18766	1.20484
stage	Equal variances not assumed			2.618	23.689	0.015	0.69625	0.26596	0.14696	1.24554

Discussion

In this study, the prevalence of ICDs among adult Filipino patients with idiopathic PD was 24.2 % (16 out of 66 subjects). This was determined by using the QUIP-RS, a validated tool for detection of ICDs in PD patients[12]. This is higher than the reported prevalence of 6 to 18.4% in Western studies and 7% in Chinese PD subjects. This diverse prevalence may be explained by type of anti-parkinsonian treatment, cultural, ethnic, social, and environmental differences[7].

Recognizing the occurrence of impulse control disorders among PD patients is significant because these behaviours may contribute to further impairment in the patient's overall quality of life. They may also cause distress among their caregivers and have social and financial consequences, as well.

According to Weintraub, (2010), patients in dopamine agonist therapy have 2 to 3.5 fold-increased odds of developing ICDs. There is an association of higher levodopa dosages with ICDs in contrast with dopamine agonists[13]. The possible neurobiological mechanism for this association lies in the understanding of the interaction of these drugs with the dopamine receptors in the brain. Dopamine 1 and 2 (D1 & D2) receptors which are mostly confined in the dorsal striatum are responsible for the effects of dopamine therapy on motor symptoms. On the other hand, dopamine 3 (D3) receptors which are predominant in the ventral striatum of the brain are associated with behavioural addictions and substance abuse disorders[14]. Non-ergot dopamine agonists have relative affinity for D3 receptors. The active metabolite of levodopa which is dopamine shows higher affinity for D1 and D2 receptors[13].

A study among Asian Parkinson disease patients by Lim, S. (2011) showed multiple demographic factors associated with ICD symptoms which include the following: male gender, longer disease duration, younger onset, dopamine agonist therapy, higher total levodopa equivalent units and higher dopamine agonist-only levodopa equivalent units. Eating, hypersexuality, hobbyism/ punding were prevalent while gambling and DDS were less frequent[15].

In the data we have gathered, 7 patients with ICDs are on pure levodopa + carbidopa therapy, 6 patients on dual therapy of levodopa + carbidopa and anticholinergics, 2 patients on combination of levodopa + carbidopa, dopamine agonists and anticholinergics, and only 1 patient on levodopa + carbidopa plus dopamine agonist. The fact that most patients were on levodopa + carbidopa treatment is due to the low socioeconomic status of most patients seen at our outpatient department. Compulsive eating (50%) and hobbyism / punding (56.52%) are the common ICD symptoms in contrast to patients in developed countries such as the United States where compulsive gambling and shopping are prevalent[13]. This may be due to cultural differences and economic profile of our subjects, as well.

There is higher risk of developing ICD symptoms with longer duration of Parkinson disease (x^2 20.41; $p = 0.026$) which is in keeping with the results garnered from other studies. With regard to PD subtype, most of the patients with ICDs had tremor dominant PD (x^2 5.78; $p = 0.056$). We are able to show that a higher mean Modified Hoehn and Yahr stage correlates with development of ICD symptoms among our subjects (2.66±0.94), t 2.735, df 64, p 0.008.

Current management of ICD symptoms remains a challenge because it entails modifying dopaminergic therapy specifically the use of dopamine receptor agonists. There is no reported evidence for using psychiatric medications to address these disabling behavioral conditions.

Conclusion

Filipino patients with idiopathic Parkinson disease who are majority on levodopa + carbidopa therapy may develop impulse control disorders (ICDs). Other contributory factors in development of ICDs include longer duration of PD and higher mean Modified Hoehn and Yahr stage.

Limitations of the Study

The limitations of the study are as follows: small sample size, lack of matched controls, and that we did not correlate levodopa equivalent doses in the medications. A future research recommendation would include proper management of ICD symptoms and their complications.

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Competing Interests

The authors have no conflict of interest to report.

References

1. Ropper A H, Samuels M A, Klein J P (2014) Adams and Victor's Principles of Neurology, 10th edition, McGraw-Hill Education, China 1082-1093
2. Gescheidt T, Bares M. Impulse Control Disorders in patients with Parkinson's Disease. 2011. *Acta Neurol. Belg., Accessed July 2015*:3-9
3. Chaudhuri, KR (2006) International Multicenter Pilot Study of the First Comprehensive Self-Completed Nonmotor Symptoms Questionnaire for Parkinson;s Disease: The NMSQuest Study. *Movement Disorders* Vol. 21, No. 7, pp. 916-923, Accessed July 2015. https://doi.org/10.1002/mds.20844
4. Weintraub D M. Impulse Control Disorders in Parkinson's Disease. 2011. Parkinson's Disease and Mental Illness Research, Education and Clinical Centers (PADRECC and MIRECC), Philadelphia VA. Accessed July 2015
5. Weintraub, D, Hoops, S, Shea, JA, Lyons, KE, Pahwa R, Driver-Dunckley ED, Adler CH, Potenza MN, Miyasaki J, Siderowf AD, Duda JE, Hurtig HI, Colcher A, Horn SS, Stern MB, Voon V (2009) Validation of the Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease (QUIP), *Movement Disorders*, 24 (10), pp 1461-1467, Accessed May 2015. https://doi.org/10.1002/mds.22571
6. Weintraub, D, Siderowf AD, Potenza MN, Goveas J, Morales KH, Duda JE, Moberg PJ, Stern MB (2006) Association of dopamine agonist use with impulse control disorders in Parkinson's disease. *Arch Neurol.* 63: pp 969-973, Accessed May 2015. https://doi.org/10.1001/archneur.63.7.969
7. Zhang G, Zhang Z, Wang T. Impulsive and compulsive behaviors in Parkinson's disease. 2014. Frontiers in Aging Neuroscience, Accessed May 2015. Vol. 6 Article 318
8. Selikhova, M, Williams, DR, Kempster PA, Holton JL, Revesz, T, Lees, AJ (2009) A Clinico-pathological study of Subtypes in Parkinson's disease. *Brain* 2009: 132; pp 2947-2957, Accessed May 2015. https://doi.org/10.1093/brain/awp234

9. SM Van Rooden, Heiser W J, Kok J N, VErbaan D, van HIlten JJ, Marinus J. Identification of Parkinson's disease Subtypes using Cluster Analysis: A Systematic Review. Movement Disorders, Accessed July 2015. 2010:969-978. https://doi.org/10.1002/mds.23116
10. Parkinson's Disease Impulsive-Compulsive Disorders Questionnaire (QUIP). www.parkinson.org, Accessed May 2015.
11. Statistics on Parkinson's. http://www.pdf.org/en/parkinson_statistics, Accessed May 2015.
12. Weintraub, D, Mamikonyan, E, Papay, K, Shea, JA, Xie, SX, Siderowf, A (2012) Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease-Rating Scale. *Movement Disorder* 27 (2): pp 242-247, Accessed May 2015. https://doi.org/10.1037/t96813-000
13. Weintraub, D, Koester, J, Potenza, MN, Siderowf, AD, Stacy, M, Voon, V, Whetteckey, J, Wunderlich, GR, Lang, AE (2010) Impulse Control Disorders in Parkinson Disease: A Cross-Sectional Study of 3090 patients. *Arch Neurol*/vol 67(No. 5). American Medical Association, Accessed July 2015. https://doi.org/10.1001/archneurol.2010.65
14. Gurevich, EV, Joyce, JN (1999) Distribution of dopamine D3 receptor expression neurons in the human forebrain: Comparison with D2 receptor expressing neurons. *Neuropsychopharmacology* ; 20(1): pp 60-80, Accessed May 2015. https://doi.org/10.1016/s0893-133x(98)00066-9
15. Lim, SY, Tan, ZK, Ngam, PI, Lor, TL, Mohammad, H, Schee, JP, Tan , AK, Goh, JY, Ooi, E, Soh, PC (2011) Impulsive-compulsive behaviors are common in Asian Parkinson disease patients: Assessment using the QUIP. Vol 17, issue 10, pp 761-764, Accessed May 2015. https://doi.org/10.1016/j.parkreldis.2011.07.009

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