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Comorbidity of Psychiatric and Psychosocial Problems in Parkinson's disease

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Abstract

The present study was mainly aimed at understanding the comorbid psychiatric and psychosocial problems that significantly influence the daily life of persons with PD. For this, 100 patients of PD aged 45 to 70 years were selected from the patients who were attending the OPD of neurology departments at PGIMS, Rohtak and PGIMER, Chandigarh to participate in the study along with 100 normal controls. Data were collected by administering Personality Assessment Inventory by Morey, 1999. Data were analyzed by descriptive statistics (Mean, SD, SK, and KU) to ascertain the normalcy of data, t-ratios to compare the two groups in terms of their mean scores of eleven clinical scales and five treatment consideration scales and Discriminant Function Analysis to examine the joint contribution of all the sixteen variables in differentiation of two groups. Results revealed that patients with PD scored significantly high on nine clinical scales out of eleven scale and high on all treatment consideration scales. Overall findings revealed the patients with Parkinson's disease tend to develop the neurotic and psychotic spectrum disorders along with the interpersonal behavioural problems and these psychopathological and social variables should be taken into account in diagnosis and treatment strategy for Parkinson's disease.

Key words: Psychiatric Problems, Psychosocial Problems, Parkinson's disease

Introduction

The disease is named after James Parkinson, a general practitioner in London during the 19th century, who described the features of PD in six individuals (Parkinson, 1887). Currently, PD affects about 1% of the population over age 50 and up to 2.5% of the population over age 70. U.S. government figures from 1994 placed annual societal costs related to PD at $20 billion (Cummings, 1999).The clinical onset of PD is typically around age 60, although juvenile or young-adult onset of the disease has been reported. It affects all races about equally, with reported discrepancies between incidence rates among Caucasians and African Americans said to be related to population sampling (Tanner *et al*., 1997). Men are affected slightly more often than women.

For many years, PD was simply considered a neurological disease. However, following the advancement of research and clinical observations, it has more recently been classified as a neuropsychiatric disorder (Martin and Duda, 2006). The term psychiatric describes the mixture of both neurological and psychological symptoms. This newer classification properly acknowledges the mental health aspects of PD, in addition to the well recognized motor symptoms. Whether an individual develops a chronic degenerative disease like PD, he or she not only must face a myriad of physical changes, but must also confront significant psychological and social changes. These changes are often subtle and difficult for the patient to express to his or her physician. Researchers have shown that these psychosocial changes may significantly increase disability and interfere with acceptance and adjustment to the disease (Cote, 1999). Observations have led scholars to conclude that more attention must be directed towards certain psychopathological factors because their neglect can interfere even with the best medical treatment programmes (Laura, 2000). Following the advancement of research and clinical evaluations, a multitude of psychiatric symptoms have been empirically observed in PD patients, including mood changes, anxiety disorders, hallucinations, psychoses, delusions, dementia and other cognitive dysfunctions. Management of these behavioral problems can greatly improve patients' overall functions and reduce the burden placed on caregivers. Specific cognitive deficits have been described in early PD, and at least, a 'third' of PD patients develops dementia (Anderson, 2004). The present study is a comprehensive effort to understand the psychopathology in PD patients.

Most of the earlier studies investigating psychopathology in PD have focused on single psychiatric diagnosis or condition. As a result, there have been gaps in knowledge pertaining to the relationship among psychopathological illnesses prior and post to the onset of PD. Comorbidity of various psychopathological conditions have been rarely studied with multivariate methodology. The present study is meritorious in this regard as it is oriented to describe the clusters of psychopathology comorbid the progression of PD. Thus, overall the present study has

been designed to understand more systematically the psychopathological problems which comorbid in PD. Another merit of the present study is that it attempts to investigate the psychopathological discriminators which jointly contribute in the discrimination of PD patients from the normal subjects by using Discriminant Function Analysis.

Awareness of the psychosocial problems and psychiatric problems which may arise is essential for professionals working with Parkinson's disease and families of persons with Parkinson's disease. Such difficulties can have a profound impact on a person's mental health. Treatment of youth with comorbid PD and psychiatric disorders is a challenge because the specific aspects of both conditions have to be carefully managed for optimal treatment results. For this, comprehensive understanding of comorbid psychopathological and social problems is essentially required. The present study is an empirical attempt to understand the comorbid psychiatric and social problems that can be highly relevant in the management/treatment strategies for PD.

METHOD

Sample

The sample used in the present study consisted of two groups of subjects i.e. Clinical group (Parkinson's disease patients, N=100) and normal controls (N=100). The PD patients were selected from the patients who were attending the OPD of neurology departments at Post-graduate Institute of Medical Sciences (PGIMS), Rohtak and Post-graduate Institute of Medical Education and Research (PGIMER) Chandigarh. The PD patients range in age from 45 to 70 years with the mean age of 57.5 years. The duration of illness in the PD patients included range from 5 to 15 years with the mean duration of 10 years. The sample consisted of both the males and females. Most of the patients were on L-dopa treatment. About 15 of the patients were on Sinemet treatment. All the patients married and were living in home setting with their family members. A normal control group consisting of 100 subjects matched for age was drawn from the general population residents of various colonies of Rohtak and Kurukshetra cities. The normal subjects were found to be free from the serious psychopathological and medical problems, which can confound the results.

Measure/Test:

The participants of the study were tested with Personality Assessment Inventory (PAI, Morey, 1999). PAI is a self administered objectively scorable inventory designed to provide information on critical clinical variables. PAI originally consists of 344 items comprising 22 non-overlapping full scales: 4 validity scales, 11 clinical scales, 5 treatment consideration scales, and 2 interpersonal scales. The validity scales are Inconsistency (INC), Infrequency (INF), Negative Impression (NIM), and Positive Impression (PIM). Clinical Scales consists of Somatic Complaints (SOM), Anxiety (ANX), Anxiety Related Disorder (ARD), Depression (DEP), Mania (MAN), Paranoia (PAR), Schizophrenia (SCZ), Borderline Feature (BOR), Antisocial Feature (ANT), Alcohol Problem (ALC), and Drug Problems (DRG), and Treatment Consideration scales include Aggression (AGG), Suicide Ideation (SUI), Stress (STR), Non-Support (NON), and Treatment Rejection (RXR). Interpersonal scales consist of Dominance (DOM) and warmth (WAR). In the present study PAI was scored for only 11 clinical scales and 5 treatment consideration scales. The variables of PAI have reported to be satisfactory across various clinical samples.

Results and discussion:

Obtained data were analyzed using the SPSS 11.5 for descriptive statistics (Mean, SD, SK and KU) ascertain the normality of data, t-ratio to compare the two groups (Parkinson's disease and Normal matched) in terms of significance of differences in mean scores of 12 variables (Table-1). Discriminant Function Analysis was used to examine the joint contribution of all the twelve variables in differentiation of two groups (Table-2)

Table 1 reveals that PD patients have obtained significantly high scores on ten scales of psychopathology viz. Somatic Complains (2.16), Anxiety(4.04), Anxiety-Related Disorders (5.32), Depression (5.86), Mania (1.89), Paranoia (4.89), Schizophrenia (1.65), Borderline Features (8.63), Anti social Features (1.88), and Drug problem (1.78) than normal controls depicting that Parkinson's disease patients tend to develop both the neurotic and psychotic-spectrum disorders after being diagnosed. Measures of somatic complain, anxiety, anxiety related disorders and depression represent neurotic-spectrum, whereas measures of paranoia, schizophrenia, borderline features and anti social features represent the psychotic-spectrum disorders (Morey, 1999). The present findings are very much confirmatory to the earlier findings which have reported high rate of comorbid psychopathological problems among parkinson's disease patients than in general population. There are numerous studies reporting that the severity of anxiety and depression in Parkinson's patients is higher than normal controls (Santanmaria et al, 1986, Fukanishi *et al*., 1991, Gotham *et al*., 1986 and Huber *et al*., 1988). Major depression and panic disorder are more prevalent in

Parkinson's patients than in general population (Cummings et al, 1992). Anxiety is often a dominant symptom of the adjustment disorder which most patients go through when first diagnosed with parkinson's disease (Vazquez *et al.*, 1993, Menza, 1993, Richard *et al*., 1996, Stein et al, 1990, Berrois *et al*., 1995, Iruela *et al*., 1992).

Table-1

Comparison of two groups (Parkinson's disease and Normal groups, N each=100) with their Mean scores, SD, SK and KU.

Clinical scales										
Var	Clinical Group				Normal Group				t-value	Sig/ NS
	Mean	SD	SK	KU	Mean	SD	SK	KU		
SOM	2.16	.97	.51	.04	1.02	.98	.80	.26	8.03	p<.01
ANX	4.04	1.42	-.18	-.56	1.86	1.32	.68	-.01	11.15	p<.01
ARD	5.32	1.74	.27	-.33	2.00	1.39	.67	.14	15.04	p<.01
DEP	5.86	1.92	-.05	-1.03	1.26	1.20	1.40	2.88	20.07	p<.01
MAN	1.89	.82	1.61	5.48	3.15	1.90	.69	.45	-5.67	p<.01
PAR	4.89	2.64	.57	-.16	2.87	1.75	.24	-.80	6.39	p<.01
SCZ	1.65	.67	.75	-.91	1.36	1.07	.91	.88	2.15	p<.01
BOR	8.63	2.41	.18	-.39	2.74	1.72	.46	.00	20.27	p<.01
ANT	1.88	.74	.56	.32	1.09	1.01	.70	-.31	5.63	p<.01
DRG	1.78	1.01	.57	-1.53	.18	.71	3.76	2.40	12.91	p<.01
Interpersonale scales										
DOM	5.21	2.04	-.07	-.75	1.96	2.12	1.23	1.81	11.04	p<.01
WRM	5.12	2.22	-.22	-1.26	1.07	1.98	2.01	3.66	14.01	p<.01

Table 2

Stepwise Discriminant Analysis with respect to patients with Parkinson's disease vs Normal Group (N=100 each group)

Variables	F-to-remove	Wilk's Lamda	Wilk's Lamda Decrement	Standardised Discreminant Function Coeffecient
DEP	36.16	.202	.148	.440
ARD	36.67	.174	.147	.436
BOR	30.22	.325	.143	.406
WRM	17.63	.152	.135	.325
SOM	18.37	.142	.135	.323
ANX	15.84	.131	.134	.309
DOM	11.25	.124	.131	.261

Canonical Discriminant Functions

Function	Eigen-value	%variance	Cumulative %variance	Canonical Correlation
1	7.091	100	100	.936
Test of function	Wilk's Lamda	Chi-square	Df	Significant
1	.124	406.649	7	.000

Classification Summary

	Predicted group membership		
Original group	Group 1	Group 2	Total

1	100	0	100
2	0	100	100
Count %			
1	100	0	100
2	0	100	100

100% of original cases correctly classified

Parkinson's disease patients scored significantly high on the two interpersonal scale i.e. dominance (5.21) and warmth (5.12) than their counterpart normal subjects. It suggests that Parkinson's patients tend to have high level of need for dominating and controlling. They prefer to interact with others in situations in which they can be in control. They are generally domineering and tend to have little tolerance for those who disagree with their plans and desires. Person with Parkinson's disease are generally eager to be liked by others and find it hard to be critical of others even when such criticism is merited. Their need for acceptance is quite pronounced and can result in marked dependency. Behavioral disorders such as hyperactivity, social withdrawal, conduct problems and aggression have been consistently seen in person with parkinson's disease. Biological, psychosocial, demographic and medication factors contribute to behavior disorders (Ellring *et al*., 1993 and Cummings, 1999). Comorbidity of parkinson's disease and psychiatric disorders are often, yet the most common are depression, nervousness and anxiety, psychosis and schizophrenia (Juncos, 1999 and Laura, 2000). These findings also highlight the relevance of coping with social problems in terms of attempts to show dominance and warmth in parkinson's disease patients in confirmation to the earlier findings.

Discriminant Analysis (Parkinson's disease Patients VS Normal Controls)

Although the comparison of mean scores of two groups on ten scales of psychopathology and two of interpersonal scales provided the differential profile of parkinson's disease patients and normal controls, yet to examine the extent to which 12 variables jointly differentiated successfully between the two groups, Discriminant Function Analysis (Tabachnick and Fiddle, 1989) was applied. By identifying the significance of selected variables in linear combination, this analysis permits (1) the understanding of synergistic role of identified discriminators in the separation of the two groups (Parkinson's disease vs. Normals), and (2) their classification accuracy, which is an additional indicator of the effectiveness of the discriminant function.

Table 2 provides a summary of the outcome of stepwise discriminant functions analysis. As can be noted, out of 12 potential discriminating variables, a set of only seven discriminators viz Depression (36.16), Anxiety-related Disorders (36.67), Borderline Features (30.22), Warmth (17.63), Somatic Complaints (18.37), Anxiety (15.84) and Dominance (11.25) formed the discriminant equation/function. These seven variables in combination contributed maximally in discriminating patients with Parkinson's disease from their normal counterparts (Eigen value=7.091). This also shows that Mania, Paranoia, Schizophrenia, Drug Problems and Antisocial Features did not comprise the discriminant function. Based on F-to-Remove values the selected set of seven discriminators was arranged in the rank order of their relative importance for discrimination/separation between groups of parkinson's disease patients and their control counterparts. As is clear from Table-2, Depression with largest F to Remove value, made the highest contribution to the overall discrimination above and beyond the contribution made by other selected variables. The values of Wilk's Lamda corroborated the observed group differences over the same set of seven variables. Since Depression increased maximum within-group cohesiveness, this variable is found more than followed by other variables in that order. The values of Wilk's Lamda decrement further confirmed the relative unique contribution of each variable to the discriminant equation above and beyond the contributions of proceeding variables. While developing the descriminant function equations, Standardized Discriminant Function Equations (SDFE) were created. The magnitude of these coefficients regardless of signs also depicts the relative and unique contribution of each variable to the discriminant function (Table 2). The SDFC provided additional information to the conclusions derived on basis of the F-to-Remove and Wilk's Lambda/decrement values. SDFC values also documented that Depression contributed highest to the discrimination/separation of the patients with Parkinson's disease and their counterpart normal controls. The direction of significant differences in respect of these

discriminators was generally consistent with the signs of SDFC loadings.

In discriminant function analysis another important question is the accuracy of classification based on identified set of discriminators. Klecka (1985) suggested that classification accuracy can be used along with F-to-Remove, Lamda, and SDFCs to indicate the amount of discrimination contained in selected variables. However, he pointed out that if chance of accuracy is 50% (two groups of equal size), the classification accuracy should be at least 62.5% (25% greater than that is achieve by chance). Based on discriminant function (Depression, Anxiety-related Disorders, Borderline Features, Warmth, Somatic Complaints, Anxiety and Dominance), the correct classification rate for Parkinson's patients and normal controls group is 100%. Thus, in Parkinson's disease group and normal groups, no cases were incorrectly classified. The overall classification accuracy of known cases emerged to be 200 out of 200 (100%), a percentage higher than 62.5%. It provides an additional confirmation of the degree of group discrimination/ separation i.e. between Parkinson's patients and normal group. Thus, Depression, Anxiety-related Disorders, Borderline Features, Warmth, Somatic Complaints, Anxiety and Dominance are hallmark symptoms of Parkinson's disease patients which discriminate them from normal individuals. Our findings are similar to the findings of Cummings et al. (1992; Menza et al., 1993 & Richard et al., 1996).

Implications:

These results provide information about patients with Parkinson's disease that may be useful in the management of their mental health problems. Awareness of mental health problems of Parkinson's disease patients among their family members, relatives and society in general may be helpful in the change of societal stigmatic perception of Parkinson's disease victims. The main implication of the present findings lie in the fact that above mentioned psychopathological and behavioural variables on which Parkinson's disease patients have scored significantly high, must be taken into account in both the diagnosis and treatment of Parkinson's disease. Hence, the present study is suggestive for eclectic approach (collaboration of medical and psychosocial treatment) to be used in both the diagnosis and treatment. For more generalizable results it is suggested to carry out the similar studies on large samples.

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