

## Depression in Parkinsonism

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### Summary :

*Fifty consecutive patients of Parkinsonism were studied to determine the prevalence of depression in Parkinsonism. By using DSM III-R criteria 16(32%) were found to have depressive disorder. Of these, 9(56.25%) were major depressive disorder and 7(43.75%) were dysthymia. Again of them 4 were severe, 7 were moderate and 5 were mild according to BDI score. Overall, BDI score was significantly higher in depressed group than in nondepressed group of Parkinsonism with a mean of 8.29 and 8 respectively. Depressed group was distinguished by significantly earlier age of onset, most prominent rigidity, greater left brain involvement and past history of depressive episode. Qualitatively depression in Parkinsonism is characterized by elevated levels of depressed mood, pessimism and hopelessness, decreased interest and pleasure, marked agitation but little guilt feelings and relative lack of psychotic features. The findings confirm the high incidence of depression in Parkinsonism and suggest that depression in Parkinsonism has a distinct entity.*

### Introduction :

Depression is a common feature in Parkinsonism. Several studies on psychiatric morbidity in Parkinsonism reported the rate of depression ranging from 25-70% with a mean of 43%. By using

chart review assessment with defined psychiatric diagnoses, Mindham found 50% prevalence of depression in 50 patients with Parkinsonism<sup>1</sup>. Gotham studied 187 Parkinsonism patients and 69% of them were found to be suffering from depression by using Beck Depression Inventory (BDI)<sup>2</sup> and Taylor found 70% depression by using same rating scale<sup>3</sup>. Santamaria found 32% depressive disorder among 34 consecutive patients of Parkinsonism by using DSM-III R criteria & BDI<sup>4</sup> and the report was the same in an analysis of 60 patients of Parkinsonism using same assessment method<sup>5</sup>. In a recent study, Starkstein found a 40% prevalence of major depression in 105 consecutive patients of Parkinsonism using structured interview and DSM -III R criteria<sup>6</sup>. By using only structured interview technique Brown found 25% depression among 40 patients of Parkinsonism<sup>7</sup>. This wide range of reported frequencies reflects the variable measures of sample, the use of different definitions of depression, thresholds for identification of a mood disorder and assessment strategies.

The causal relationship between Parkinsonism and depression observed in different reports suggests that a patient with Parkinsonism may be depressed because of widespread disturbances in brain amine levels as a reaction to the disabling qualities of the illness in both, or other factors unrelated to the illness<sup>2</sup>.



Neurobiological investigations suggest that depression in Parkinsonism may be mediated by dysfunction in mesocortical/prefrontal reward & motivational and stress-response systems. Neuropsychological, metabolic, clinical, Pharmacological and anatomical studies support the involvement of frontal dopaminergic projections in patients with Parkinsonism and depression<sup>1-8</sup>. Depression in Parkinsonism responds to treatment with conventional tricyclic antidepressants or ECT<sup>9,10</sup>.

The present study was designed to assess the prevalence of depression in the patients with Parkinsonism and to determine whether depression was related to any allied variables in comparison with depressed group and nondepressed group of patients of Parkinsonism.

#### **Materials and Methods :**

The study was carried out in Neurology departments of Institute of Postgraduate Medicine and Research, Dhaka Medical College Hospital and Mitford Hospital of Dhaka City. A consecutive series of 50 inpatients and outpatients with Parkinsonism from May 1994 to October 1995 were selected for the study. Patients with overt clinical signs of dementia, history of cardiovascular disease, CVA, encephalitis, head trauma or other neurological problems were excluded. All subjects were interviewed with a pretested semistructured questionnaire consisting of sociodemographic parameters, relevant information about Parkinsonism and depression. Thorough clinical, neurological and mental state examinations were done. All patients except 5 were receiving antiparkinsonian medication. Depressive

disorder was assessed clinically by DSM III-R criteria<sup>11</sup>. Then 13- item short version of Beck Depression Inventory (BDI) was administered to all subjects to test and quantify it<sup>12</sup>. The collected data were processed and comparison was made between nondepressed and depressed group. Statistical analysis involved t-tests and chi-square tests to interpret the data.

#### **Results :**

A total of 50 cases of Parkinsonism were included in the study. Their age ranged between 32 and 84 years with a mean of 48.4 (SD = 15.29) years. Of these, 16 were found to be suffering from depressive disorder. Mean age of nondepressed group was 56.76 (SD = 13.07) years and that for depressed group was 45.94 (SD = 9.42) years. The difference was statistically significant ( $t = 3.35$ ,  $df = 48$ ,  $P < 0.01$ ). Among the subjects 39 were male and 11 were female. The male and female ratio was 1 : 0.28. Eighteen were illiterate. Among the 32 literate, primary educated, S.S.C passed and graduate were 8, 13 and 11 cases respectively. Thirteen cases were service holder, 11 were retired, 10 were housewives, 8 were cultivators, 3 were unemployed and rest were of other occupations. Urban rural distribution were 26 and 24 cases respectively. Twenty cases were predominantly of low income group and only two cases belonged to higher class. Forty three cases were married, 1 was unmarried, 5 were widowed and one was divorced. No statistically significant differences of these sociodemographic variables were found between nondepressed and depressed group other than age.

Among the subjects, nondepressed and depressed group were compared on



measures of Parkinsonism. The mean age of onset of Parkinsonism was found 46.76 (SD = .75) years in nondepressed group and that for depressed group was 54 (SD = 8.66) years. The difference was nonsignificant. Duration of illness ranged from 3 months to 24 years. Mean duration for nondepressed group was 5.82 (SD = 4.15) years and that for depressed group was 5.44 (SD = 4.33) years which was also not significant (Table- I).

Table-II shows the predominant motor features of Parkinsonism. Hypokinesia was found in 23 patients, tremor and rigidity were found in 21 and 6 cases respectively. Though significantly higher rate of rigidity

was found in depressed group ( $X^2 = 5.14$ ,  $df = 1$ ,  $P < 0.05$ ), overall no significant difference of motor manifestations were found between two groups. Predominant sided motor features of Parkinsonism is shown in Table-III. Of the total number of cases, 22 were of both sided. Fifteen and 13 cases were of right and left sided respectively. The significant difference of left sided predominance was observed in nondepressed group ( $x^2 = 4.57$ ,  $df = 1$ ,  $P < 0.05$ ) and right sided predominance was found in depressed group ( $X^2 = 5.69$ ,  $df = 1$ ,  $P < 0.05$ ), though overall predominance between depressed and nondepressed group was not statistically significant.

**Table-I**

*Comparison of depressed and nondepressed patients of parkinsonism on different measures*

Measure	Nondepressed group	Depressed group	t-test
Age of onset	46.76 ± 11.75	46 ± 8.66	0.32 P > 0.05
Duration	5.82 ± 5.15	5.44 ± 4.23	0.26, P > 0.05
BDI Score	8.29 ± 3.42	18 ± 4.87	2.31 P < 0.05

\* Data are expressed as mean ± SD

**Table - II**

*Predominant motor features of Parkinsonism*

Motor sign	Nondepressed group		Depressed group		X <sup>2</sup> Significance
	(N = 34)	%	(N= 16)	%	
Tremor	15	44.12	6	37.50	Not significant (NS)
Hypokinesia	16	47.06	7	43.75	Not significant (NS)
Rigidity	3	8.82	3	18.75	P < 0.05

$X^2 = 1.03$   $df = 2$ ,  $P > 0.05$



**Table-III**  
*Predominant sided motor features of Parkinsonism*

Motor sign	Nondepressed group		Depressed group		X <sup>2</sup> Significance
	(N = 34)	%	(N= 6)	%	
Left	11	32.35	2	12.50	P <0.05
Right	8	23.53	7	43.75	P <0.05
Both	15	44.12	7	43.75	NS

X<sup>2</sup> = 3.13, df = 2, P > 0.05

Personal history of depressed patients revealed that among the subjects, 41 had no history of past depressive episode. Past history of depression was present in 9 cases. Of these, 6 cases were of depressed group and 3 cases were of nondepressed group. The difference was statistically significant (X<sup>2</sup> = 6.06, df = 1, P < 0.05). First degree family history of psychiatric disorder was absent in most of the cases. Of the 7 cases of positive family history, depressive disorder was found in 2 cases in nondepressed group and 1 case was found in depressed group. Family history of bipolar disorder was found in 2 cases of each group. The difference of positive family history between two groups was non-significant (X<sup>2</sup> = 0.66, df 2, P < 0.05).

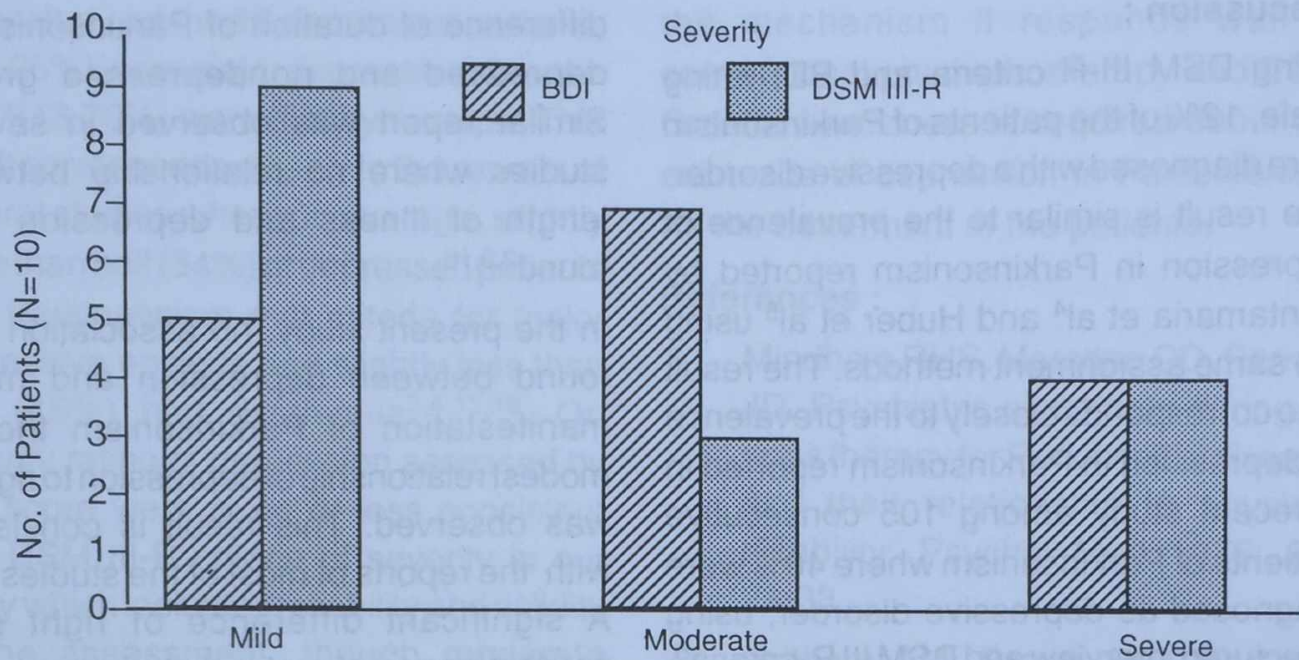
According to DSM III-R criteria, 16(32%) cases were found to be suffering from depressive disorder. Considering the type of depression, 9 were of major depressive disorder and 7 met the criteria of dysthymia with late onset. On severity rating, 4 were severe, 3 were moderate and 9 were mild (considering dysthymia as minor form of severity).

Mean BDI score of all the cases are 1.4 (SD = 6.44). On comparison it was revealed that mean score of nondepressed group was 8.29 (SD = 3.42) and that of depressed group was 18 (SD = 4.87). The difference was significant (Table-I) though the rate of depression found by BDI was similar with DSM III-R. On severity rating by BDI it revealed that 4 were severe, 7 were moderate and 5 were mild. This comparison of severity of depression is shown in Fig-1.

In most of the cases (62.5%) of depressive disorder, the duration of depressive episode were found between 5 months to 1 year and the mean duration was found 1.81 (SD = .33) years. Frequency of depressive symptoms according to DSM III-R is shown in Table-IV. All the 16 cases had depressed mood and lack of interest & pleasure. Psychomotor agitation was seen in 6 cases and retardation in 3 cases. Suicidal thought was found in 4 cases. Only 1 case had associated mood congruent psychotic features.

Among the 16 depressed patients 6(37.5%) were receiving anti-depressants.





**Fig-1** : Severity of depression in comparison with BDI and DSM III-R

**Table-IV** : Frequency of symptoms of depression according to DSM III-R  
**Major Depressive Disorder**

Symptoms	Number (N=9)	Percentage
1. Depressed mood	9	100.00
2. Diminished interest and pleasure	9	100.00
3. Weight loss	8	88.89
4. Insomina	9	100.00
5. a. Psychomotor agitation	6	66.67
b. Psychomotor retardation	3	33.33
6. Fatigue or loss of energy	8	88.89
7. Feeling of worthlessness or guilt	2	22.22
8. Diminished ability to think or concentrate	9	100.00
9. Suicidal thought	5	55.55
10. Mood congruent psychotic features	1	11.11

#### Dysthymia

Symptoms	Number (N=7)	Percentage
A. Depressed mood	7	100.00
B. (1) Poor appetite	7	100.00
(2) Insomnia	6	85.00
(3) Low energy or fatigue	6	85.00
(4) Low self esteem	3	42.86
(5) Poor concentration	3	42.86
(6) Feeing of hopelessness	6	85.7



## Discussion :

Using DSM III-R criteria and BDI rating scale, 12% of the patients of Parkinsonism were diagnosed with a depressive disorder. The result is similar to the prevalence of depression in Parkinsonism reported by Santamaria et al<sup>4</sup> and Huber et al<sup>5</sup> using the same assignment methods. The result also corresponds closely to the prevalence of depression in Parkinsonism reported in a recent study among 105 consecutive patients of Parkinsonism where 40% were diagnosed as depressive disorder, using structured interview and DSM III R-criteria<sup>6</sup>. Mean BDI score was found 11.4 in total number of cases of Parkinsonism in our study. This finding is consistent with reports of mean BDI score of 11.1, 11.9 and 11.6 in different studies<sup>4,13,14</sup>. The mean score was found significantly higher in depressed group than in nondepressed group of Parkinsonism. The result is similar with the findings of other reports where internal consistency and reliability within the Parkinsonism was high and BDI including the somatic items was proved to be a reliable and valid measure of depression in Parkinsonism<sup>6,14</sup>.

In our study, though age was significantly lower in depressed group of Parkinsonism, no significant difference was found in the patient's age of onset of Parkinsonism between two groups. The result is consistent with a majority of studies where no relationship was observed between depression and the patient's age of onset of Parkinsonism<sup>2,9,15</sup>. However, two studies reported that depressed patients with Parkinsonism tended to be younger at the time of onset of Parkinsonian symptoms<sup>4,6</sup>. In our study, there was no significant

difference of duration of Parkinsonism in depressed and nondepressed group. Similar report was observed in several studies where no relationship between length of illness and depression was found<sup>2,9,16</sup>.

In the present study, no association was found between depression and motor manifestation of Parkinsonism though modest relationship of depression to rigidity was observed. This result is consistent with the reports of most of the studies<sup>4,7,9</sup>. A significant difference of right side predominance of motor disturbances was found in depressed group in our study. This findings is similar with other reports<sup>6,9,17</sup>. Sterkstein et al found that those with more right sided abnormalities had higher depression rating scale score<sup>6</sup>. Drenfeld et al reported that patients with right hemiparkinsonism (greater left brain dysfunction) had somewhat higher BDI score than those with a predominance of left sided signs on those with bilateral involvement<sup>17</sup>.

In the present study, past history of depression was found significantly higher in depressed patients which is consistent with the reports of two studies where past history of depression was identified as a risk factor for a major mood disorder after the onset of Parkinsonian symptoms<sup>6,18</sup>. There was no significant difference of first degree family history of mood disorder between depressed and nondepressed group of Parkinsonism in our study. The result is similar with the findings of other studies<sup>6,18</sup>. These reports suggest that depression in Parkinsonism is unlikely to be a product of an independently inherited familial disorder.



In our study, of the 16 depressed patients, 9(56.25%) were major depressive disorder and 7(43.75%) were dysthymic type. This result corresponds closely to the reports of several studies where on average, slightly more than half (54%) of depressed patients with Parkinsonism met criteria for major depressive episode and slightly less than half (45%) had dysthymia<sup>2,4,13,18</sup>. On severity rating of depression assessed by BDI score were more or less consistent with DSM III-R criteria of severity in our study which indicates reliability and validity of the assessment, though moderate severity was excess and mild severity was less in BDI score. This might be due to some artifacts or limitations in applying self rating scale in our set up.

In the present study, the profile of depressive symptoms according to DSM III-R criteria revealed that patients had elevated levels of dysphoria, lack of interest, agitation, suicidal idea but little guilt feelings and relative lack of psychotic features. The result has similarity with the analysis of BDI score which was found in the reports of several studies<sup>3,5,7,9,14,16,19</sup>.

Here, in this study, 37.5% depressed patients were getting antidepressants. This indicates growing awareness about the existence of depression among the patients with Parkinsonism.

### **Conclusion :**

Depression in Parkinsonism has both clinical and theoretical significance. It is evident that the pattern of depression was significantly associated with severity of illness, functional disability, individual differences in coping with style and availability of support. Whatever may be

the mechanism it responds well to conventional pharmacotherapy and ECT. Greater awareness is required about the existence of depression in Parkinsonism for the betterment of the patients.

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