

Assessment of the Relationship between Non-motor features and Severity of Parkinson's Disease Patients in Bangladesh



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বাংলাদেশের

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Background

- Parkinson's disease (PD) is 2nd most common neurodegenerative disorder after Alzheimer's disease.^{1,2}
- PD may present with both motor and non-motor symptoms (NMSs).³
- Many of the ignored NMSs may potentiate further deterioration of the patient's quality of life (QoL).⁴
- But there is scarcity of data regarding NMSs of PD patients and their relationship with the disease severity in Bangladesh.

Objectives

- This study was aimed to investigate the frequency of NMSs.
- To assess their debatable impact on the severity of PD patients in Bangladesh.

Methodology

- **Study design** : Cross Sectional Type of Observational Study.
- **Place of study** : Neurology department of Dhaka Medical College Hospital
- **Study population** : PD patients selected consecutively at Neurology OPD
- **Study Period** : 1st January, 2012 to 30th June, 2013
- **Sample size** : 60 eligible PD patients
- **Sampling method** : Non-probability purposive sampling.
- **Institution Approval** : Local ethical committee from Dhaka Medical College (Ref: - DMC/Ethical/2013/39, Date: - 03/03/2013)

Selection criteria

- **Inclusion criteria:**

- All the idiopathic Parkinson's disease patients were included in our study with the aim of purposive sampling method who had agreed to provide informed consent.

- **Exclusion Criteria:**

- Parkinson's patients having secondary cause, dementia and Parkinson's plus syndrome were excluded from our study.

- PD with severe comorbidities such as end stage renal failure, congestive cardiac failure, decompensated chronic hepatic failure and complete bed ridden were also excluded.

Clinical Stage of Parkinson's Disease

Hoehn and Yahr staging of Parkinson's disease is used in this study.⁵

- ***Stage I:*** Unilateral involvement only, minimal or no functional impairment.
- ***Stage II:*** Bilateral or midline involvement, without impairment of balance.
- ***Stage III:*** First sign of impaired righting reflex, mild to moderate disability.
- ***Stage IV:*** Fully developed, severely disabling disease; patient still able to stand and walk unassisted.
- ***Stage V:*** Mostly advanced disease, confined to bed or wheelchair.

Analysis

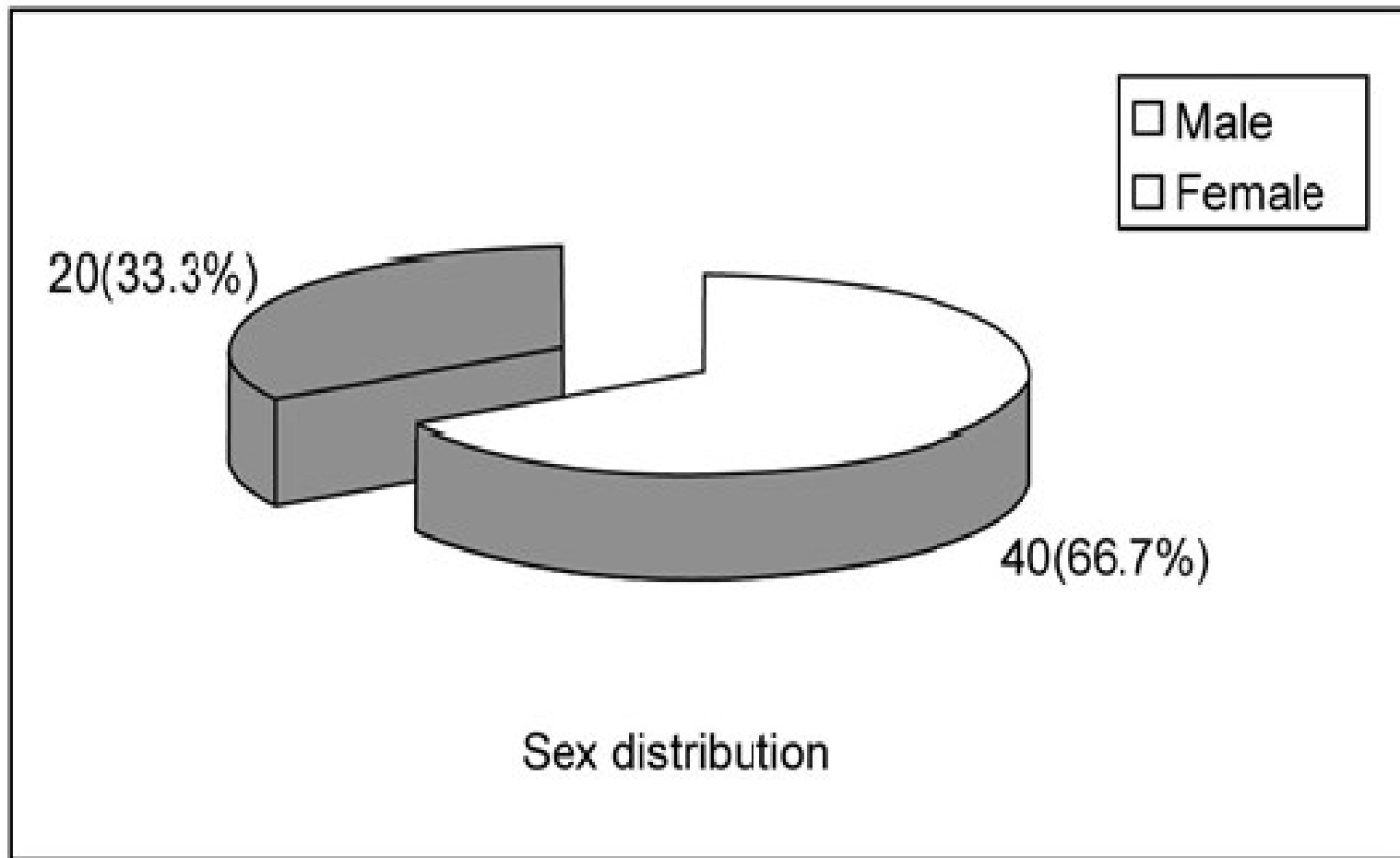
- Statistical analyses were carried out by using the SPSS version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA).
- Continuous variables were expressed as mean, standard deviation and categorical variables as frequencies and percentages.
- The difference between groups was analyzed by unpaired t-test or chi-square (X^2) test and shown with cross tabulation and also the Pearson correlation coefficient was used for testing associations.
- A p-value <0.05 was considered as significant.

Results

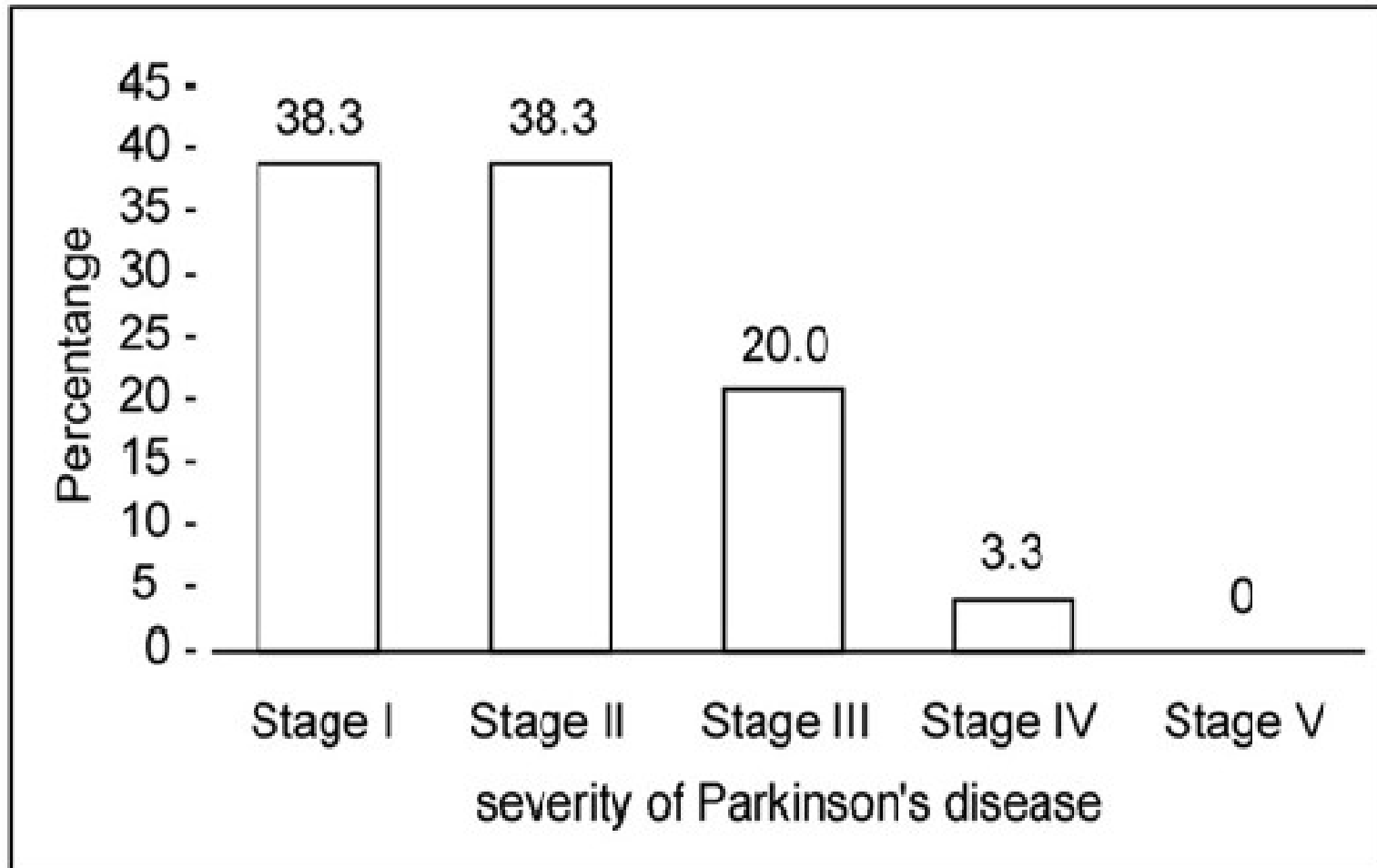
Distribution of the patients by age (n=60)

| Age (years) | Number of patients | Percentage |
|-----------------|--------------------|------------|
| 40-49 | 13 | (21.7%) |
| 50-59 | 20 | (33.3%) |
| 60-69 | 14 | (23.3%) |
| ≥70 | 13 | (21.7%) |
| Mean±SD | 57.88±10.56 years | |
| Range (min-max) | 40-80 years | |

Distribution of the patients by sex



Distribution of the patients by severity of Parkinson's disease according to the Hoehn and Yahr scale



Distribution of non-motor symptoms of the patients irrespective of severity of PD

| Non-Motor Symptoms | Number of patients | Percentage |
|---|--------------------|------------|
| Nocturia | 40 | (66.7%) |
| Sadness or blues | 39 | (65.0%) |
| Memory disturbance | 37 | (61.7%) |
| Anxiety | 35 | (58.3%) |
| Insomnia | 34 | (56.7%) |
| Orthostatic hypotension | 33 | (55.0%) |
| Erectile dysfunction | 30 | (50.0%) |
| Urinary urgency | 28 | (46.7%) |
| Anhedonia | 27 | (45.0%) |
| Olfactory disturbance or Ageusia | 23 | (38.3%) |
| Constipation | 23 | (38.3%) |
| Hyper or hypo sexuality | 19 | (31.7%) |
| Restless leg syndrome or periodic leg movements | 19 | (31.7%) |
| Weight loss | 16 | (26.7%) |

Cont'd

| | | |
|--------------------------------------|----|---------|
| Dysphagia or Choking | 15 | (25.0%) |
| Attention deficit | 15 | (25.0%) |
| Nausea or Vomiting | 12 | (20.0%) |
| Unexplained pains | 12 | (20.0%) |
| Excessive daytime sleepiness | 12 | (20.0%) |
| Dribbling of saliva (during daytime) | 11 | (18.3%) |
| REM behaviour disorder | 11 | (18.3%) |
| Leg swelling | 10 | (16.7%) |
| Falls | 9 | (15.0%) |
| Vivid dream | 9 | (15.0%) |
| Fecal incontinence | 7 | (11.7%) |
| Unsatisfactory voiding of bowel | 7 | (11.7%) |
| Sweating abnormality | 3 | (05.0%) |
| Visual or auditory hallucinations | 0 | (0.00%) |
| Double vision | 0 | (0.00%) |
| Delusion | 0 | (0.00%) |

Distribution of Non-Motor Symptoms according to severity of PD

| Non-Motor Symptoms | Stage I (n=23) | | Stage II (n=23) | | Stage III (n=12) | | Stage IV (n=2) | |
|---|-------------------|----------------|--------------------|----------------|---------------------|----------------|-------------------|---------------|
| | n | % | n | % | n | % | n | % |
| Dribbling of saliva (during daytime) | 0 | (0.00%) | 5 | (21.7%) | 4 | (33.3%) | 2 | (100%) |
| Olfactory Disturbance or Ageusia | 9 | (39.1%) | 8 | (34.8%) | 5 | (41.7%) | 1 | (50.0%) |
| Dysphagia or Chocking | 2 | (8.70%) | 3 | (13.0%) | 8 | (66.7%) | 2 | (100%) |
| Nausea or Vomiting | 6 | (26.1%) | 5 | (21.7%) | 1 | (8.30%) | 0 | (0.00%) |
| Constipation | 9 | (39.1%) | 3 | (21.7%) | 9 | (75.0%) | 2 | (100%) |
| Fecal incontinence | 0 | (0.00%) | 2 | (8.70%) | 5 | (41.7%) | 0 | (0.00%) |
| Unsatisfactory voiding of bowel | 4 | (17.4%) | 3 | (13.0%) | 0 | (0.00%) | 0 | (0.00%) |
| Urinary urgency | 6 | (26.1%) | 13 | (56.5%) | 8 | (66.7%) | 1 | (50.0%) |
| Nocturia | 8 | (34.8%) | 19 | (82.6%) | 11 | (91.7%) | 2 | (100%) |
| Unexplained pains | 4 | (17.4%) | 4 | (17.4%) | 2 | (16.7%) | 2 | (100%) |
| Weight loss | 0 | (0.00%) | 11 | (47.8%) | 5 | (41.7%) | 0 | (0.00%) |
| Memory disturbance | 11 | (47.8%) | 15 | (65.2%) | 9 | (75.0%) | 2 | (100%) |
| Anhedonia | 4 | (17.4%) | 11 | (47.8%) | 10 | (83.3%) | 2 | (100%) |
| Visual or auditory hallucinations | 0 | (0.00%) | 0 | (0.00%) | 0 | (0.00%) | 0 | (0.00%) |

Distribution of Non-Motor Symptoms according to severity of PD

| | | | | |
|---|------------|------------|------------|-----------|
| Attention deficit | 4 (17.4%) | 5 (21.7%) | 5 (41.7%) | 1 (50.0%) |
| Sadness or blues | 13 (56.5%) | 15 (65.2%) | 10 (83.3%) | 1 (50.0%) |
| Anxiety | 9 (39.1%) | 13 (56.5%) | 11 (91.7%) | 2 (100%) |
| Hyper or hypo sexuality | 4 (17.4%) | 7 (30.4%) | 6 (50.0%) | 2 (100%) |
| Erectile dysfunction | 9 (29.1%) | 12 (52.2%) | 7 (58.3%) | 2 (100%) |
| Orthostatic hypotension | 10 (43.5%) | 13 (56.5%) | 8 (66.7%) | 2 (100%) |
| Falls | 0 (0.00%) | 0 (0.00%) | 7 (58.3%) | 2 (100%) |
| Excessive daytime sleepiness | 0 (0.00%) | 5 (21.7%) | 7 (58.3%) | 0 (0.00%) |
| Insomnia | 7 (30.4%) | 16 (69.6%) | 9 (75.0%) | 2 (100%) |
| Vivid dream | 0 (0.00%) | 5 (21.7%) | 3 (16.7%) | 1 (50.0%) |
| REM behaviour disorder | 0 (0.00%) | 6 (26.1%) | 4 (33.3%) | 1 (50.0%) |
| Restless leg Syndrome or Periodic leg movements | 3 (13.0%) | 9 (39.1%) | 6 (50.0%) | 1 (50.0%) |
| Leg swelling | 3 (13.0%) | 3 (13.0%) | 3 (25.0%) | 1 (50.0%) |
| Sweating abnormality | 0 (0.00%) | 1 (43.0%) | 2 (16.7%) | 0 (0.00%) |

Comparison between Non Motor Symptoms in stage I and stage II

| Non-Motor Symptoms | Stage I (n=23) | | Stage II (n=23) | | p value |
|---|-------------------|---------|--------------------|---------|--------------------|
| | n | % | n | % | |
| Dribbling of saliva (during daytime) | | | | | |
| Present | 0 | (0.00%) | 5 | (21.7%) | ^a 0.024 |
| Absent | 23 | (100%) | 18 | (78.3%) | |
| Olfactory disturbance or Ageusia | | | | | |
| Present | 9 | (39.1%) | 8 | (34.8%) | ^b 0.760 |
| Absent | 14 | (60.9%) | 15 | (65.2%) | |
| Dysphagia or Choking | | | | | |
| Present | 2 | (8.70%) | 3 | (13.0%) | ^a 0.500 |
| Absent | 21 | (91.3%) | 20 | (87.0%) | |
| Nausea or Vomiting | | | | | |
| Present | 6 | (26.1%) | 5 | (21.7%) | ^b 0.729 |
| Absent | 17 | (73.9%) | 18 | (78.3%) | |
| Constipation | | | | | |
| Present | 9 | (39.1%) | 3 | (13.0%) | ^b 0.043 |
| Absent | 14 | (60.9%) | 20 | (87.0%) | |
| Fecal incontinence | | | | | |
| Present | 0 | (0.00%) | 2 | (8.70%) | ^a 0.244 |
| Absent | 23 | (100%) | 21 | (91.3%) | |

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| Unsatisfactory voiding of bowel | | | | | |
| Present | 4 | (17.4%) | 3 | (13.0%) | ^a 0.500 |
| Absent | 19 | (82.6%) | 20 | (87.0%) | |
| Urinary urgency | | | | | |
| Present | 6 | (26.1%) | 13 | (56.5%) | ^b 0.036 |
| Absent | 17 | (73.9%) | 10 | (43.5%) | |
| Nocturia | | | | | |
| Present | 8 | (34.8%) | 19 | (82.6%) | ^b 0.00 |
| Absent | 15 | (65.2%) | 4 | (17.4%) | |
| Unexplained pains | | | | | |
| Present | 4 | (17.4%) | 4 | (17.4%) | ^a 0.650 |
| Absent | 19 | (82.6%) | 19 | (82.6%) | |
| Weight loss | | | | | |
| Present | 0 | (0.00%) | 11 | (47.8%) | ^b 0.001 |
| Absent | 23 | (100%) | 12 | (52.2%) | |
| Memory disturbance | | | | | |
| Present | 11 | (47.8%) | 15 | (65.2%) | ^b 0.324 |
| Absent | 12 | (52.2%) | 8 | (34.8%) | |
| Anhedonia | | | | | |
| Present | 4 | (17.4%) | 11 | (47.8%) | ^a 0.027 |
| Absent | 19 | (82.6%) | 12 | (52.2%) | |

Cont'd

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|--|----|---------|----|---------|--------------------|
| Insomnia | | | | | |
| Present | 7 | (30.4%) | 16 | (69.6%) | ^b 0.007 |
| Absent | 16 | (69.6%) | 7 | (30.4%) | |
| Vivid dream | | | | | |
| Present | 0 | (0.00%) | 5 | (21.7%) | ^a 0.024 |
| Absent | 23 | (100%) | 18 | (78.3%) | |
| REM behaviour disorder | | | | | |
| Present | 3 | (13.0%) | 9 | (39.1%) | ^a 0.010 |
| Absent | 20 | (87.0%) | 14 | (60.9%) | |
| Restless leg syndrome or Periodic leg movements | | | | | |
| Present | 3 | (13.0%) | 9 | (39.1%) | ^a 0.043 |
| Absent | 20 | (87.0%) | 14 | (60.9%) | |
| Leg swelling | | | | | |
| Present | 3 | (13.0%) | 3 | (13.0%) | ^a 0.500 |
| Absent | 20 | (87.0%) | 20 | (87.0%) | |
| Sweating abnormality | | | | | |
| Present | 0 | (0.00%) | 1 | (4.30%) | ^a 0.500 |
| Absent | 23 | (100%) | 22 | (95.7%) | |
| Double vision | | | | | |
| Present | 0 | (0.00%) | 0 | (0.00%) | - |
| Absent | 23 | (100%) | 23 | (100%) | |
| Delusion | | | | | |
| Present | 0 | (0.00%) | 0 | (0.00%) | - |
| Absent | 23 | (100%) | 23 | (100%) | |

Comparison between Non Motor Symptoms in stage II and stage III (n=60)

| Non-Motor Symptoms | Stage II (n=23) | | Stage III (n=12) | | P value |
|---|---|---------|---------------------|---------|--------------------|
| | n | % | n | % | |
| | Dribbling of saliva (during daytime) | | | | |
| Present | 5 | (21.7%) | 4 | (33.3%) | ^a 0.163 |
| Absent | 18 | (78.3%) | 8 | (66.7%) | |
| Olfactory disturbance or Ageusia | | | | | |
| Present | 8 | (34.8%) | 5 | (41.7%) | ^a 0.483 |
| Absent | 15 | (65.2%) | 7 | (58.3%) | |
| Dysphagia or Choking | | | | | |
| Present | 3 | (13.0%) | 8 | (66.7%) | ^a 0.002 |
| Absent | 20 | (87.0%) | 4 | (33.3%) | |
| Nausea or Vomiting | | | | | |
| Present | 5 | (21.7%) | 1 | (8.30%) | ^a 0.310 |
| Absent | 18 | (78.3%) | 11 | (91.7%) | |
| Constipation | | | | | |
| Present | 5 | (21.7%) | 9 | (75.0%) | ^a 0.003 |
| Absent | 18 | (78.3%) | 3 | (25.0%) | |
| Fecal incontinence | | | | | |
| Present | 2 | (8.70%) | 5 | (41.7%) | ^a 0.033 |
| Absent | 21 | (91.3%) | 7 | (58.3%) | |

Cont'd

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|--|----|---------|----|---------|--------------------|
| Unsatisfactory voiding of bowel | | | | | |
| Present | 3 | (13.0%) | 0 | (0.00%) | ^a 0.270 |
| Absent | 20 | (87.0%) | 12 | (100%) | |
| Urinary urgency | | | | | |
| Present | 12 | (56.5%) | 8 | (66.7%) | ^b 0.417 |
| Absent | 10 | (43.5%) | 4 | (33.3%) | |
| Nocturia | | | | | |
| Present | 21 | (91.3%) | 11 | (91.7%) | ^a 0.734 |
| Absent | 2 | (8.70%) | 1 | (8.33%) | |
| Unexplained pains | | | | | |
| Present | 4 | (17.4%) | 2 | (16.7%) | ^a 0.671 |
| Absent | 19 | (82.6%) | 10 | (83.3%) | |
| Weight loss | | | | | |
| Present | 11 | (47.8%) | 5 | (41.7%) | ^b 0.728 |
| Absent | 12 | (52.2%) | 7 | (58.3%) | |
| Memory disturbance | | | | | |
| Present | 15 | (65.2%) | 9 | (75.0%) | ^a 0.423 |
| Absent | 8 | (34.8%) | 3 | (25.0%) | |
| Anhedonia | | | | | |
| Present | 11 | (47.8%) | 10 | (83.3%) | ^a 0.044 |
| Absent | 12 | (52.2%) | 2 | (16.7%) | |
| Visual or auditory hallucinations | | | | | |
| Present | 0 | (0.00%) | 0 | (0.00%) | - |
| Absent | 23 | (100%) | 12 | (100%) | |

Cont'd

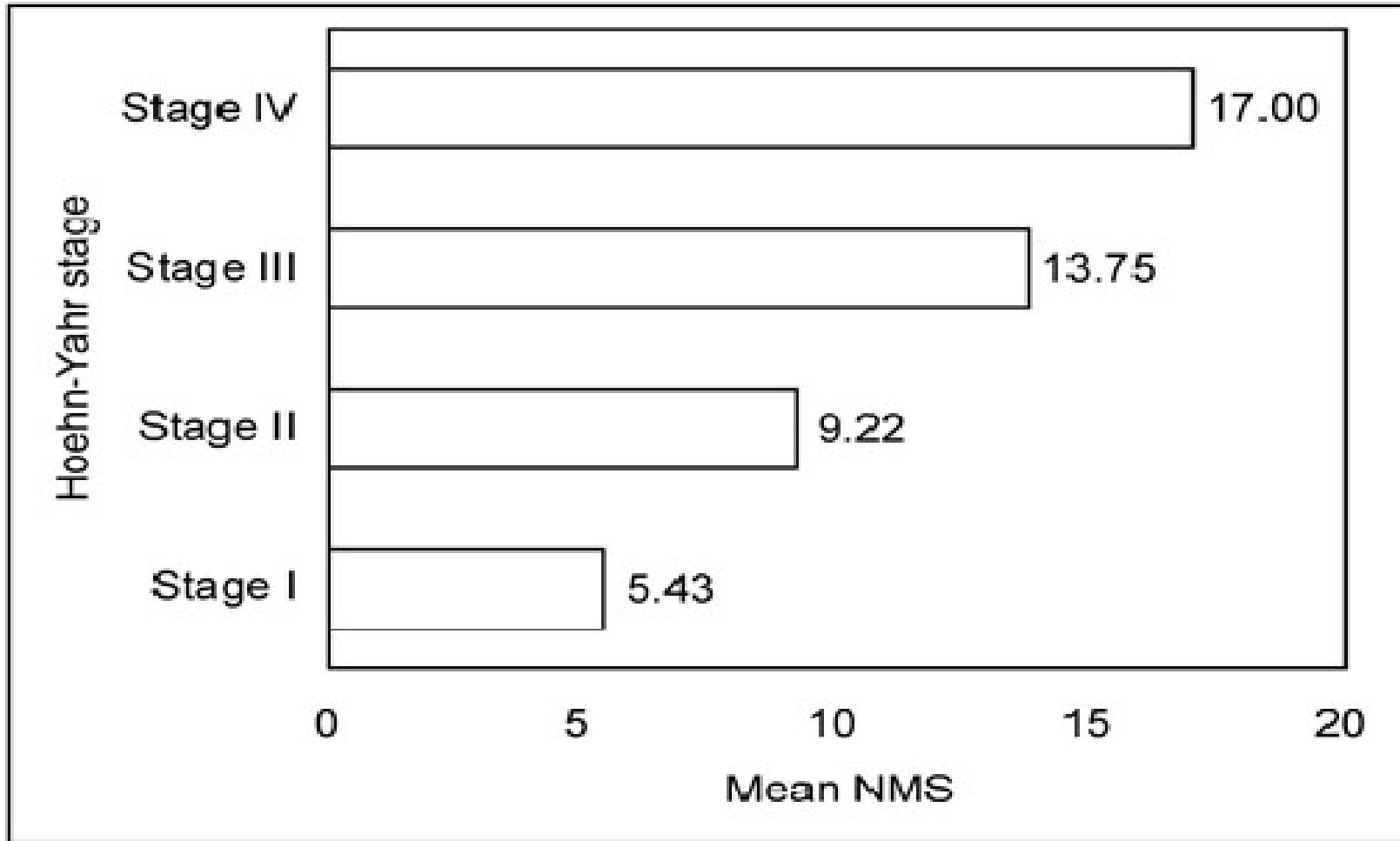
| | | | | | |
|-------------------------------------|----|---------|----|---------|--------------------|
| Attention deficit | | | | | |
| Present | 5 | (21.7%) | 5 | (41.7%) | ^a 0.198 |
| Absent | 18 | (78.3%) | 7 | (58.3%) | |
| Sadness or blues | | | | | |
| Present | 15 | (65.2%) | 10 | (83.3%) | ^a 0.235 |
| Absent | 8 | (34.8%) | 2 | (16.7%) | |
| Anxiety | | | | | |
| Present | 13 | (56.5%) | 11 | (91.6%) | ^a 0.036 |
| Absent | 10 | (43.5%) | 1 | (16.6%) | |
| Hyper or hypo sexuality | | | | | |
| Present | 7 | (30.4%) | 6 | (50.0%) | ^a 0.220 |
| Absent | 16 | (69.6%) | 6 | (50.0%) | |
| Erectile dysfunction | | | | | |
| Present | 12 | (52.2%) | 7 | (58.3%) | ^b 0.728 |
| Absent | 11 | (47.8%) | 5 | (41.7%) | |
| Orthostatic hypotension | | | | | |
| Present | 13 | (56.5%) | 8 | (66.7%) | ^a 0.417 |
| Absent | 10 | (43.5%) | 4 | (33.3%) | |
| Falls | | | | | |
| Present | 0 | (0.00%) | 7 | (58.3%) | ^a 0.00 |
| Absent | 23 | (100%) | 5 | (41.7%) | |
| Excessive daytime sleepiness | | | | | |
| Present | 2 | (8.70%) | 5 | (41.7%) | ^a 0.033 |
| Absent | 21 | (91.3%) | 7 | (58.3%) | |

Cont'd

| | | | | | |
|--|----|---------|----|---------|--------------------|
| Insomnia | | | | | |
| Present | 16 | (69.6%) | 9 | (75.0%) | ^a 0.529 |
| Absent | 7 | (30.4%) | 3 | (25.0%) | |
| Vivid dream | | | | | |
| Present | 5 | (21.7%) | 2 | (16.7%) | ^a 0.546 |
| Absent | 18 | (78.3%) | 10 | (83.3%) | |
| REM behaviour disorder | | | | | |
| Present | 6 | (26.1%) | 5 | (41.7%) | ^a 0.285 |
| Absent | 17 | (73.9%) | 7 | (58.3%) | |
| Restless leg syndrome or Periodic leg movements | | | | | |
| Present | 9 | (30.4%) | 6 | (50.0%) | ^a 0.220 |
| Absent | 14 | (69.6%) | 6 | (50.0%) | |
| Leg swelling | | | | | |
| Present | 3 | (13.0%) | 3 | (25.0%) | ^a 0.328 |
| Absent | 20 | (87.0%) | 9 | (75.0%) | |
| Sweating abnormality | | | | | |
| Present | 1 | (4.30%) | 2 | (16.7%) | ^a 0.265 |
| Absent | 22 | (95.7%) | 10 | (83.3%) | |
| Double vision | | | | | |
| Present | 0 | (0.00%) | 0 | (0.00%) | - |
| Absent | 23 | (100%) | 12 | (100%) | |
| Delusion | | | | | |
| Present | 0 | (0.00%) | 0 | (0.00%) | - |
| Absent | 23 | (100%) | 12 | (100%) | |

Average of non-motor symptoms (NMS) according to Hoehn and Yahr stage

(Kruskal-Wallis test, $p=0.0001$)



Strength and Limitation

- ***Strength:*** This was the first study in Bangladesh where the relationship between non-motor features and severity of Parkinson's patients had been seen.
- ***Limitation:*** This cross sectional study was conducted unicentral and with limited number of PD patients.

Recommendation

- **Multicentral, large scale and nationwide survey is recommended**
- **Physicians should also pay attention to non-motor features of Parkinson's patients which can help to improve their QoL**

Conclusion

- Most of the PD patients presented in the 6th decade with male predominance.
- Nocturia, sadness, memory disturbance, anxiety, insomnia, orthostatic hypotension were more frequent NMSs among our PD patients.
- Dribbling of saliva, constipation, urinary urgency, nocturia, weight loss, excessive daytime sleepiness, REM behavior disorder and periodic leg movements were significantly higher in stage II in comparison to stage I
- Dysphagia, constipation, fecal incontinence, anxiety, fall and excessive daytime sleepiness were significantly higher in stage III in comparison to stage II
- More severe Parkinson's disease based on Hoehn and Yahr staging related to more significant number of NMSs.

Reference

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Stress Relievers in Physician's Life

(Rule of 9)

- 0= No Objections
- 1= 1 Wife/Husband
- 2= 2 Kids
- 3= 3 Rooms Apartment
- 4= 4 Wheels Car
- 5= 5 Practicing Days/Week
- 6= 6 Digits Income/Month
- 7= 7 Places Visit/Year
- 8= 8 Hours Sleep/Day
- 9= 9K Steps/Day

Collected

