

# GENDER EFFECT ON NON-MOTOR SYMPTOMS IN PARKINSON'S DISEASE: ARE MEN MORE AT RISK?

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## Introduction

Differences between genders in the occurrence of non-motor symptoms (NMS) in Parkinson's Disease (PD) have been thoroughly studied. Nonetheless, only few studies have enrolled a control population in order to take into account the risk attributable to normal aging.

The aim of this study was to evaluate the burden of NMS in PD and the possible gender differences in their occurrence.

## Materials and methods

The FRAGAMP study is a large multicenter case-control study involving five Movement Disorder centers located in Central-Southern Italy. PD patients and controls underwent a face-to-face interview and a neurological examination performed by trained neurologists. Presence of NMS was investigated using a standardized questionnaire exploring different domains; cognitive impairment and depression were assessed using the Mini Mental State Examination and the Hamilton Depression Rating Scale respectively. Presence of hallucinations was evaluated using the Scale for the Assessment of Positive Symptoms.

## Results

585 PD patients (59.5% men; age at the enrollment  $66.8 \pm 9.8$  years) and 481 controls (34.9% men; age at the enrollment  $63.4 \pm 10.1$  years) were enrolled in the study. At the moment of the study, PD patients had a mean disease duration of  $7.2 \pm 5.6$  years; UPDRS-ME was  $19.1 \pm 10.1$ , Hoehn-Yahr score was  $2.3 \pm 0.8$ .

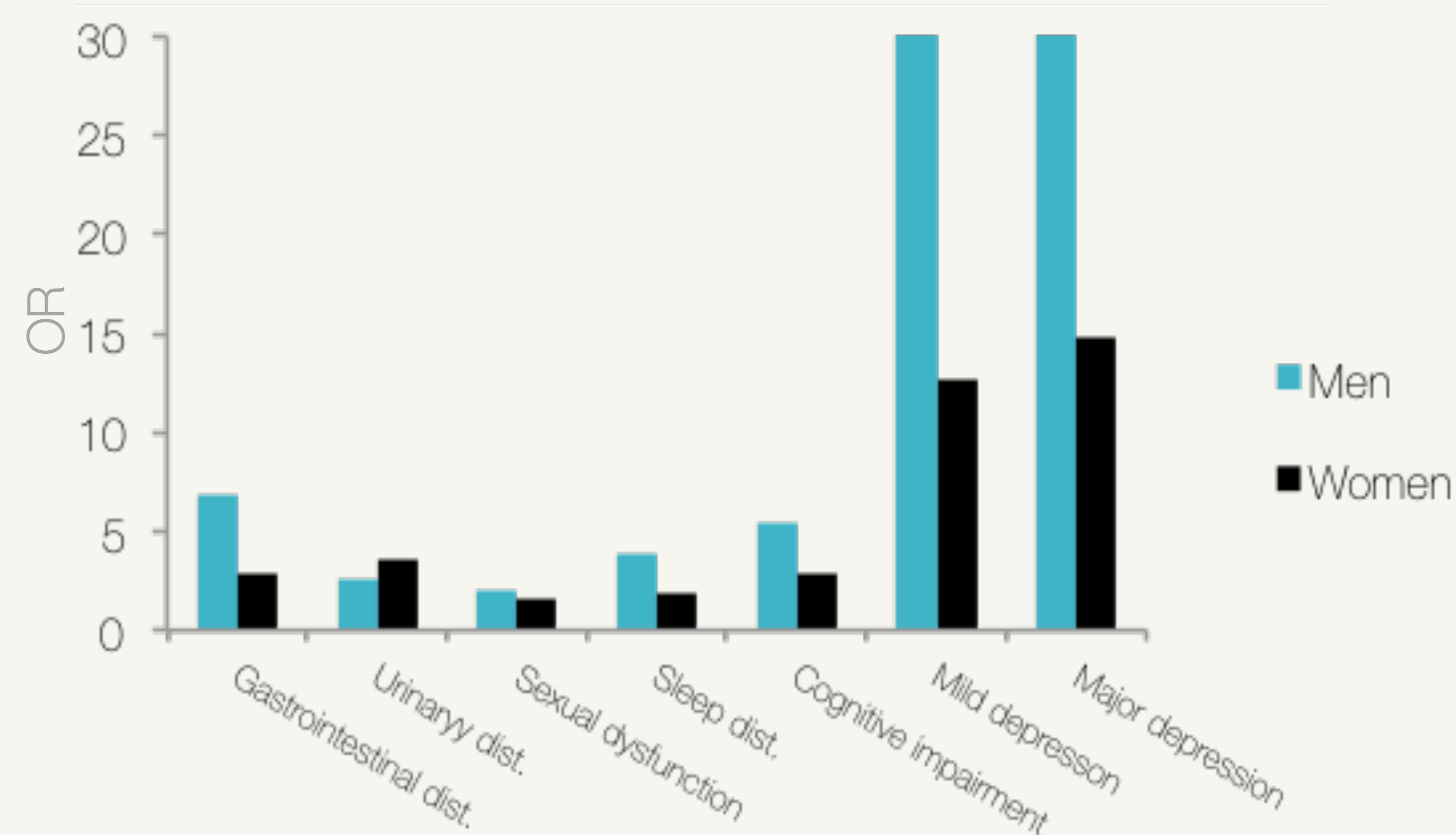
All NMS were significantly more frequent among PD patients than controls. PD women showed a significantly higher frequency of depression and urinary disturbances than parkinsonian men; a close frequency among PD women and men was recorded for hallucination, cognitive impairment and sleep disorders (table 1). Nonetheless, with respect to the control population, according to logistic regression stratified by sex and adjusted by age, PD men showed an almost double risk of developing all NMS, excepting urinary disturbances, than women. The strongest association among PD men was recorded for cognitive impairment (adjusted OR 5.44 for men and 2.82 for women) and depression (adjusted OR 30.88 for men and 12.72 for women) (table 2; figure 1).

Table 1. Frequency of NMS among PD patients and controls.

	PD patients (n = 585)		Controls (n=481)		Adj OR	95% CI	P-value
	n	%	n	%			
Gastrointestinal disturbance	338	57.8	126	26.2	3.90	2.95 – 5.16	<0.0001
Urinary disturbance	192	32.8	60	12.5	3.13	2.23 – 4.39	<0.0001
Sexual dysfunction <sup>a</sup>	135	55.3	36	23.7	2.82	1.67 – 4.74	<0.0001
Decreased libido <sup>b</sup>	90	38.6	45	27.6	1.81	1.15 – 2.86	0.01
Sleep disturbances	355	60.7	178	37.0	2.71	2.09 – 3.53	<0.0001
Hallucinations	79	13.5	0	0	–	–	–
Cognitive impairment <sup>c</sup>	92	15.7	20	4.2	3.73	2.23 – 6.25	<0.0001
Mild depression <sup>d</sup>	180	30.8	13	2.7	16.7	9.30 – 30.12	<0.0001
Major depression <sup>e</sup>	115	19.7	6	1.25	19.6	8.47 – 45.27	<0.0001

Legend: OR adjusted by age and sex considered as a priori confounders. <sup>a</sup> including erectile dysfunction (244 cases and 152 controls); <sup>b</sup> decreased libido only (233 cases and 163 controls). AF = Attributable Fraction. <sup>c</sup> Cognitive impairment = Mini Mental State Examination  $\leq 24$ . <sup>d</sup> Mild depression = Hamilton Depression Rating Scale (HDRS)  $>9$ . <sup>e</sup> Major depression = HDRS  $>13$ .

Figure 1. NMS and PD multivariate analysis, logistic regression, stratified by sex.



## Conclusion

With respect to the general population PD men showed a higher risk of developing almost all NMS than women. Our data suggest that the presence of NMS among PD men is more strictly due to the neurodegenerative processes related to PD.

Table 2. NMS and PD multivariate analysis, logistic regression, stratified by sex.

	Men		Adj OR	95% CI	P-value	Women		Adj OR	95% CI	P-value
	PD patients (n = 348)	Controls (n=168)				PD patients (n = 237)	Controls (n=313)			
	n (%)	n (%)				n (%)	n (%)			
Gastrointestinal dist.	194 (55.7)	31 (18.4)	6.81	4.26 – 10.87	<0.0001	144 (60.7)	95 (30.3)	2.84	1.96 – 4.13	<0.0001
Urinary dist.	102 (29.3)	26 (15.5)	2.52	1.54 – 4.11	<0.0001	90 (38.0)	34 (10.9)	3.64	2.29 – 5.80	<0.0001
Sexual dysfunction <sup>a</sup>	80 (41.7)	13 (26.0)	1.96	0.94 – 4.06	0.07	19 (36.5)	23 (22.5)	1.64	0.77 – 3.52	0.2
Sleep dist.	210 (60.5)	49 (29.1)	3.83	2.57 – 5.71	<0.0001	145 (61.7)	127 (40.6)	1.86	1.29 – 2.68	0.0001
Hallucinations	42 (12.1)	0	–	–	–	37 (15.6)	0	–	–	–
Cognitive impairment <sup>b</sup>	55 (15.8)	6 (3.6)	5.44	2.27 – 12.98	<0.0001	37 (15.6)	14 (4.5)	2.82	1.43 – 5.56	<0.0001
Mild depression <sup>c</sup>	95 (27.4)	2 (1.2)	30.88	7.50 – 126.93	<0.0001	85 (35.9)	11 (3.5)	12.72	6.49 – 24.95	<0.0001
Major depression <sup>d</sup>	59 (17.0)	1 (0.6)	33.84	4.64 – 246.61	0.001	56 (23.6)	5 (1.6)	14.74	5.69 – 38.18	<0.0001

Legend: OR Adjusted by age. <sup>a</sup> Decreased libido only. <sup>b</sup> Cognitive impairment = Mini Mental State Examination  $\leq 24$ ; <sup>c</sup> Mild depression = Hamilton Depression Rating Scale (HDRS)  $>9$ ; <sup>d</sup> Major depression = HDRS  $>13$ .