

**Table e-1 Mean scores clinical measures when excluding patients with late onset depressive disorder (LOD) and healthy controls (HC) on medications potentially affecting these scores\***

Clinical assessment	LOD	HC	P
	<b>n=33</b>	<b>n=24</b>	
UPDRS Motor Examination mean (SD)	0.7 (1.5)	1.9 (2.5)	.004
	<b>n= 19</b>	<b>n=30</b>	
RBD1Q "yes" n (%)	5 (13.8)	2 (6.6)	.08
RBDSQ mean (SD)	4.1 (3.1)	2.1 (2.1)	.02
	<b>n=26</b>	<b>n=24</b>	
SCOPA-AUT mean (SD)	14.3 (7.7)	7.6 (5.1)	.001

Mann Whitney U test, Fisher's Exact test

Abbreviations UPDRS= Unified Parkinson's Disease Rating scale, RBD1Q= REM Sleep Behavior Disorder Single-Question Screen, RBDSQ= The REM sleep Behaviour Disorder screening questionnaire, SCOPA-AUT= Scales for Outcomes in Parkinson's disease- Autonomic.

\*Potentially affecting RBDSQ, RBD1Q; Citalopram, Sertraline, Escitalopram, Venlafaxine, Fluoxetine, Nortriptyline, Amitriptyline, Paroxetine, Olanzapine and Risperidone, SCOPA AUT: Nortriptyline, Risperidone, Olanzapine, Pregabalin, Lisinopril, Atenolol, Losartan, Amlodipine, Ramipril, Bisoprolol and Bendroflumethiazide, MDS-UPDRS motor examination: Olanzapine, Risperidone and Amlodipine.

**Table e-2 Baseline characteristics of patients with late onset depressive disorder (LOD) and healthy controls (HC) who had a <sup>123</sup>I-ioflupane SPECT**

	LOD (n=29)	HC (n=25)	p
Age in years mean (SD)	67.7 (7.5)	69.7 (9.0)	.37
Male/ Female n (%)	13 (45)	9 (36)	.35
Caucasian n (%)	25 (86.2)	24 (96)	.23
Family history of PD/ dementia n (%)	9 (31)	6 (24)	.40
<12 years education n (%)	8 (27.6)	5 (20)	.37
Q risk score ^ mean (SD)	18.8 (11.6)	19.2 (12.1)	.96
Anti-hypertensive treatment n (%)	10 (34.5)	4 (16.4)	.11
Diabetes n (%)	5 (17)	3 (12)	.44
Current/ Previous smoker n (%)	15 (51.7)	10 (40)	.28*

Independent samples t test, Mann Whitney U test and Fisher's exact

^Q risk score=Cardiovascular risk test calculator (<https://qrisk.org/2017/>, 2017), using the age, sex, ethnicity, smoking status, diabetes status and evidence of; chronic kidney disease, atrial fibrillation, blood pressure treatment and Rheumatoid arthritis, 2 HC did not complete the q risk

\*Current and ex-smoker vs Non smoker

Abbreviations; PD =Parkinson's disease

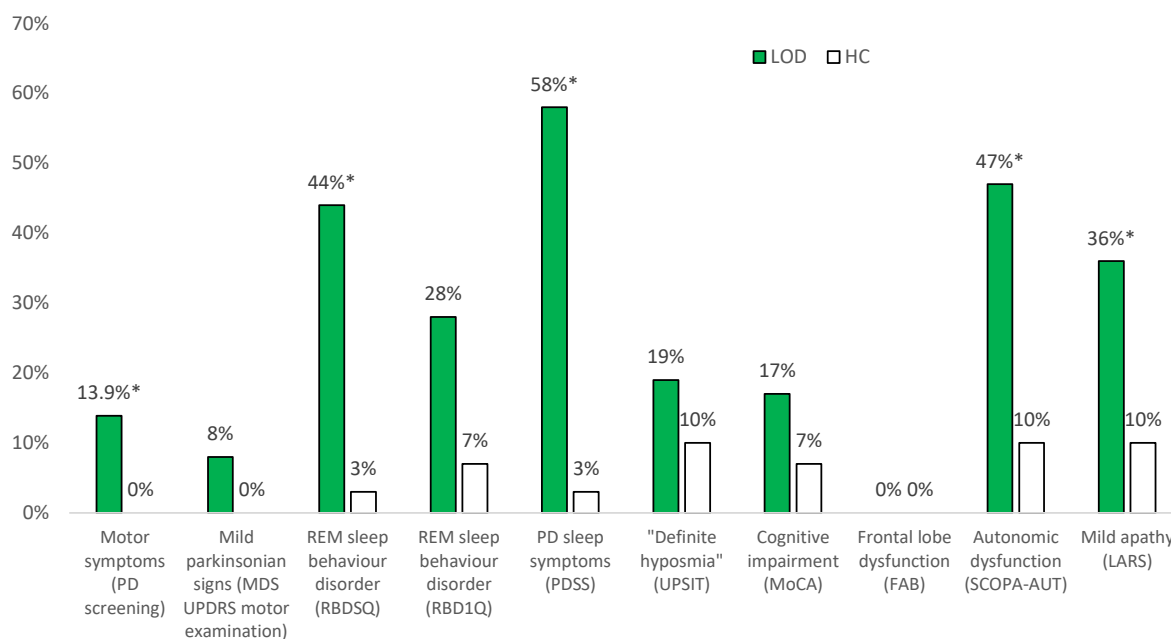
**Table e-3 Comparison of MRI findings between patients with late onset depressive disorder (LOD) and healthy controls (HC)**

Region	LOD	HC	<i>p</i>
	<b>Mean mm<sup>3</sup> (SD)</b>		
	<b>Median [1<sup>st</sup> IQ; 3<sup>rd</sup> IQ]</b>		
<b>Third Ventricle</b>	3.11 (0.15)	3.15 (0.12)	.20
	3.11 [3.01;3.22]	3.18 [3.04; 3.25]	
<b>Fourth Ventricle</b>	3.27 (0.11)	3.27 (0.10)	.48
	3.27 [2.20;3.33]	3.26 [3.19;3.36]	
<b>Right Caudate</b>	3.49 (0.05)	3.49 (0.05)	.47
	3.48 [3.46;3.53]	3.48 [3.43;3.51]	
<b>Left Caudate</b>	3.46 (0.05)	3.47 (0.05)	.89
	3.45 [3.41;3.49]	3.46 [3.43;3.51]	
<b>Right Putamen</b>	3.59 (0.04)	3.59 (0.02)	.19
	3.59 [3.55;3.63]	3.59 [3.57;3.62]	
<b>Left Putamen</b>	3.60 (0.05)	3.60 (0.03)	.26
	3.60 [3.56;3.63]	3.60 [3.58;3.63]	
<b>Right Hippocampus</b>	3.55 (0.04)	3.58 (0.03)	.08
	3.56 [3.52;3.58]	3.57 [3.54;3.61]	
<b>Left Hippocampus</b>	3.54 (0.05)	3.55 (0.03)	.45
	3.54 [3.50;3.59]	3.55 [3.53;3.59]	
<b>Right Amygdala</b>	3.18 (0.05)	3.21 (0.03)	.07
	3.20 [3.16;3.21]	3.21 [3.2;3.24]	
<b>Left Amygdala</b>	3.19 (0.05)	3.21 (0.03)	.24
	3.19 [3.17;3.24]	3.21 [3.18;3.24]	
<b>Total white matter</b>	5.61 (0.05)	5.61 (0.05)	.30
	5.61 [5.58;5.65]	5.61 [5.57;5.65]	
<b>Total grey matter</b>	5.64 (0.03)	5.65 (0.03)	.83
	5.64 [5.62;5.67]	5.65 [5.63;5.67]	
<b>Total white matter lesion</b>	3.04 (0.60)	3.16 (0.63)	.96
	3.04 [2.54;3.43]	3.25 [2.62;3.56]	

Analysis of variance (ANCOVA) with total intracranial volume (TIV), type of scanner, age and gender as a covariate.

Abbreviations: mm<sup>3</sup>=millimeters cube, SD= standard deviation.

**Figure e-1 Patients with LOD (n=36) and healthy controls (HC) (n=30) that had abnormal scores on the clinical scales when using cut-offs**



\* $p < 0.05$  using a Fisher's Exact between participant groups

LOD= late onset depressive disorder, PD screening= Parkinson's disease screening questionnaire, MPS= Mild Parkinsonian signs, RBD1Q= REM Sleep Behavior Disorder Single-Question Screen, RBDSQ= The REM sleep Behaviour Disorder screening questionnaire, PDSS=Parkinson's disease sleep scale, UPSIT= University of Pennsylvania Smell Identification Test, MoCA= Montreal Cognitive Assessment, FAB=Frontal Assessment Battery, SCOPA-AUT= Scales for Outcomes in Parkinson's disease- Autonomic, , LARS= Lille Apathy Rating Scale

*References for the clinical assessments and cut offs used:*

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