

Supplementary Material

Predicting the Prognosis of Multiple System Atrophy Using Cluster and Principal Component Analysis

Supplementary Table 1. Correlation between scales.

	subtype	fall	dysphagia	Constipation	Incontinence	UMSARS Part1	UMSARS Part2	UMSARS Part3	UMSARS Part4	COMPASS-31	RBD-Q	SS-16	HAMD	HAMA	MMSE
subtype	1.00	-0.18	-0.10	-0.27	-0.00	-0.17	-0.30	0.12	-0.16	-0.08	0.06	0.14	-0.28	-0.26	0.14
fall	-0.18	1.00	0.22	0.15	0.01	0.21	0.09	0.01	0.10	0.10	-0.07	0.03	0.09	0.19	0.02
dysphagia	-0.10	0.22	1.00	-0.02	0.16	0.32	0.27	0.06	0.20	-0.08	-0.03	-0.09	0.07	0.10	-0.10
constipation	-0.27	0.15	-0.02	1.00	0.12	0.33	0.31	0.06	0.34	0.48	0.27	0.11	0.23	0.39	0.03
incontinence	-0.00	0.01	0.16	0.12	1.00	0.40	0.24	0.08	0.31	0.37	0.24	-0.09	0.21	0.28	-0.12
UMSARS Part1	-0.17	0.21	0.32	0.33	0.40	1.00	0.75	0.07	0.72	0.44	0.05	-0.07	0.35	0.36	-0.31
UMSARS Part2	-0.30	0.09	0.27	0.31	0.24	0.75	1.00	-0.02	0.75	0.24	0.04	-0.15	0.41	0.35	-0.30
UMSARS Part3	0.12	0.01	0.06	0.06	0.08	0.07	-0.02	1.00	0.06	0.30	0.17	0.05	0.03	0.13	0.01
UMSARS Part4	-0.16	0.10	0.20	0.34	0.31	0.72	0.75	0.06	1.00	0.32	0.05	-0.16	0.32	0.33	-0.14
COMPASS-31	-0.08	0.10	-0.08	0.48	0.37	0.44	0.24	0.30	0.32	1.00	0.31	0.11	0.25	0.41	-0.02
RBD-Q	0.06	-0.07	-0.03	0.27	0.24	0.05	0.04	0.17	0.05	0.31	1.00	0.04	0.02	0.18	0.17
SS-16	0.14	0.03	-0.09	0.11	-0.09	-0.07	-0.15	0.05	-0.16	0.11	0.04	1.00	-0.24	-0.20	0.29
HAMD	-0.28	0.09	0.07	0.23	0.21	0.35	0.41	0.03	0.32	0.25	0.02	-0.24	1.00	0.79	-0.16
HAMA	-0.26	0.19	0.10	0.39	0.28	0.36	0.35	0.13	0.33	0.41	0.18	-0.20	0.79	1.00	-0.10
MMSE	0.14	0.02	-0.10	0.03	-0.12	-0.31	-0.30	0.01	-0.14	-0.02	0.17	0.29	-0.16	-0.10	1.00

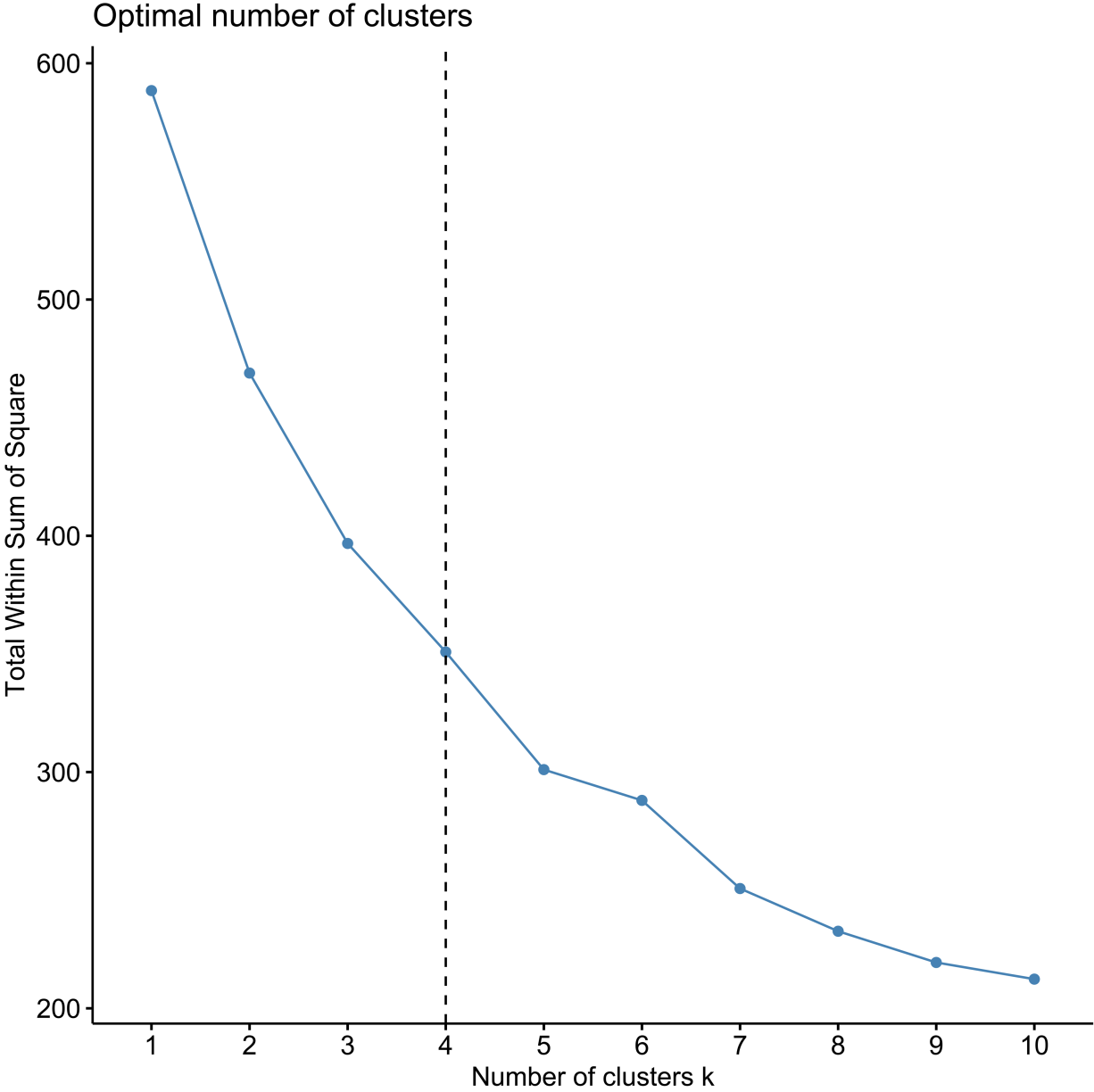
UMSARS-II, the Unified Multiple System Atrophy Rating Scale; COMPASS31, Composite autonomic symptom score; RBDSQ, RBD Screening Questionnaire; SS-16, 16-item odor identification test from Sniffin' Sticks; HAMD, 17-item Hamilton Rating Scale for Depression; HAMA, Hamilton Anxiety Scale; MMSE, Mini-Mental State Examination,

Supplementary Table 2. Correlation between raw scales and PCA.

	Motor PCA		Nonmotor PCA		
	motor PC1	motor PC2	nonmotor PC1	nonmotor PC2	nonmotor PC3
subtype	-0.04	-0.24	/	/	/
fall	-0.18	0.72	/	/	/
dysphagia	-0.06	0.52	/	/	/
constipation	/	/	0.14	0.21	0.15
incontinence	/	/	0.08	-0.07	0.23
UMSARSPart1	0.33	0.04	/	/	/
UMSARSPart2	0.38	-0.07	/	/	/
UMSARSPart3	/	/	-0.27	0.21	0.57
UMSARSPart4	0.39	-0.12	/	/	/
COMPASS31	/	/	0.02	0.05	0.41
RBDQ	/	/	0.08	0.29	0.12
SS16	/	/	-0.19	0.39	0.11
HAMD	/	/	0.46	-0.05	-0.15
HAMA	/	/	0.44	0.05	-0.06
MMSE	/	/	0.09	0.63	0.27

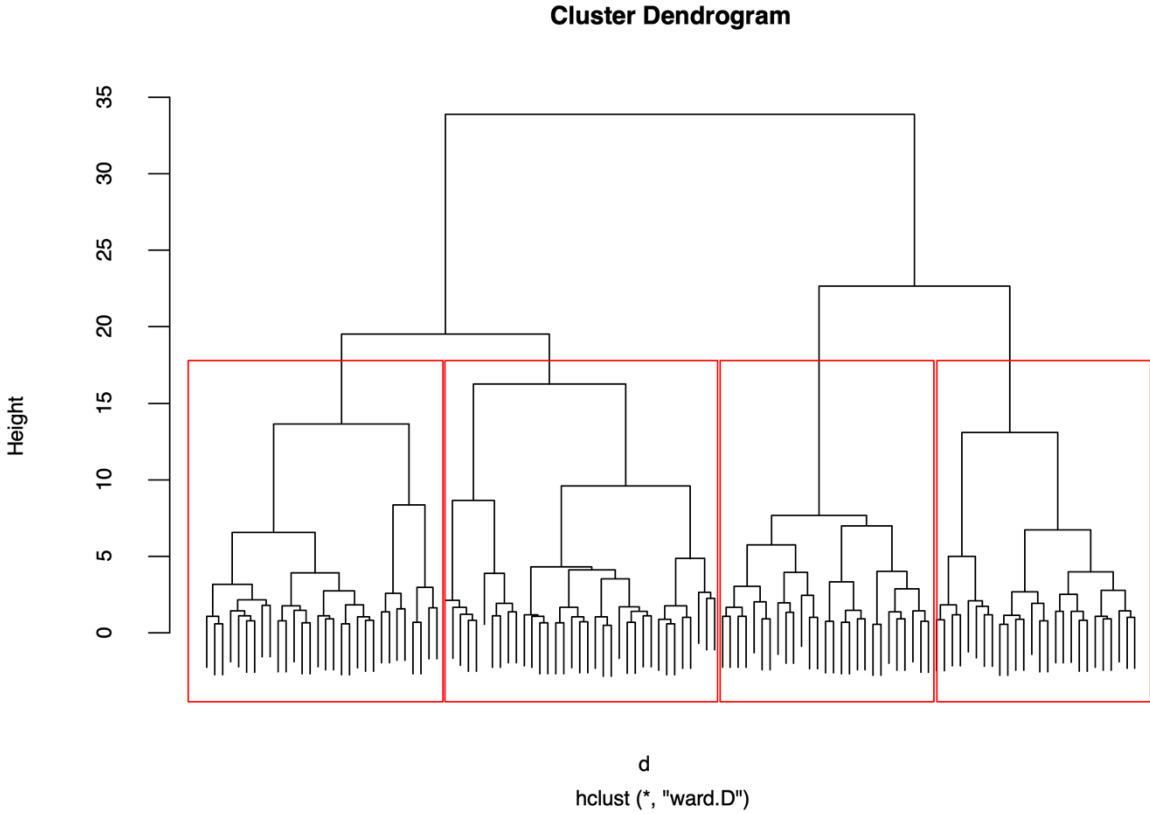
UMSARS-II, the Unified Multiple System Atrophy Rating Scale; COMPASS31, Composite autonomic symptom score; RBDSQ, RBD Screening Questionnaire; SS-16, 16-item odor identification test from Sniffin' Sticks; HAMD, 17-item Hamilton Rating Scale for Depression; HAMA, Hamilton Anxiety Scale; MMSE, Mini-Mental State Examination; PCA, performed principal component analysis,

Supplementary Figure 1. The total within-cluster sum of squares for clusters (k) 1 to 20.



This metric measures the compactness of the clustering solution. The location of a bend (knee) in the plot can be used as an indicator for the appropriate number of clusters.

Supplementary Figure 2. The dendrogram for hierarchical clustering.



The y-axis represents the distance between clusters.

Supplementary Figure 3. Flow diagram of patient selection and allocation.

