

Table S1. Demographics and clinical data of included studies.

Reference	Subjects (women)	Age	Type of MS	MS Duration y	EDSS	T2 LV	Depression Evaluation	Cognitive Evaluation	Clinical Evaluations	Disease Modifying Drugs
<i>Cross Sectional</i>										
[53]	F:5(12) NF:9 (8)	F:43(27-53)* NF:39(23-53)*	RRMS	F:5(1-14)* NF:3(0-9)*	F:3(1-3.5)* NF:2(1.5-3.5)*	NR	Major Depression Inventory score ≤ 26	DSC F:10 NF:10	Motor function (CA) F:98.1(85.1-100)* NF:99.8(96.9-100)*	F: 6 untreated, 10 interferon, 1 glatiramer acetate NF: 4 untreated, 13 interferon
[124]	F:9(21) NF:10(20)	F:41.2(23-54)* NF:40.2(21-62)*	RRMS	F:14.5(1-44)* NF:11.5(1-27)*	F:2.0(1.0-6.0)* NF:1.5(1-6.0)*	F:10.1(13.8) mL NF:11.2(12.1) mL	Chicago Multiscale Depression Inventory below the cut-off level for the Italian population	PASAT F:34.5 NF:34.6	NR	54: interferon beta-1a/1b glatiramer acetate, 6: natalizumab
[60]	F:10(18) NF:11(20)	F:40.5(21-62)* NF:39.6(23-54)*	RRMS	F:13.8(1-44)* NF:11.2(1-27)*	F:2(1-5.5)* NF:1.5(1-6)*	F:8.3(12.9)mL NF:11.2(11.8) mL	CMDI<italian cut off	PASAT-P/PASAT-I: F:22/6 NF: 23/8	NR	NR
[77]	F:15 ModeratelyF: 14 LF:14	F:43(2.9) Moderately F39(3) NF:39(1.7)	RRMS	F:10(1.7) ModeratelyF. 9.2(1.2) NF:8.6(1.9)	F:2(1-4)* ModeratelyF: 2(1-4)* NF:2(1-4)*	F:14(2.5) mL ModeratelyF: 18.8(4.8) mL NF:15.3(5.9) mL	NR	NR	NR	MS: fingolimod.
[50]	F:71 NF:81	F:33.3(8.2) NF:34.4(8.8)	RRMS	F:9.9(7.1) NF:8.7(6.7)	F:3.3(1.8) NF:2.2(1.5)	F:9.2(7.9) cm3 NF:8.8(7.7) cm3	BDI ≤ 18	NR	NR	61: glatiramer acetate 58: natalizumab 33: untreated

[96]	F:2(14) NF:4(9)	F:42.19(11) NF:36.31(9.42)	RRMS	F:11.31(9.3) NF:7.92(4.89)	F:1.37(1.91) NF:1.04(1.35)	NR	NR	NR	MSS: F:1.84(2.64) NF:1.31(1.96) IFS: F:23.38(0.53) NF:23.88(1.06)) IC-AS: F:-0.49(0.83) NF:0.64(0.99) EC-AS: F:1.09(1.56) NF:1.27(1.63)	NR
[80]	F: 21 NF: 17	F:51(44-67)* NF:53(34-62)*	F: 3 RRMS, 11 PPMS, 7 SPMS NF: 3 RRMS, 5 PPMS, 9 SPMS	F:11.90(6.55) NF:11.47(5.30)	F:6.50(5.50-6.50)* NF:6(3-6.50)*	NR	BDI≤19	SDMT: F:39.43(13.73) NF:44.35(12.59)	HADSanxiety: F:6.14(3.47) NF:3.88(1.93) HADSdepression: F:6.05(2.60) NF:4(2.72) TAS: F:52.71(9.25) NF:45.35(11.53) ESS: F:3(1-8.50)* NF:1(1-5.50)*	F: 8 untreated 4 Dimethyl fumarate, 3 Natalizumab , 2, Interferon-β, 2 Teriflunomide, 1 Methotrexate , 1 Rituximab NF: 11 untreated, 3 Natalizumab , 2 Fingolimod, 1 Glatiramer acetate
[99]	F:14 NF:14 (19W 9M)	F:39.1(8.9) NF:37.6(6.6)	RRMS	F:6(1-40)* NF:8(3-22)*	F:1(0-1)* NF:1(0-1)*	NR	NR	NR	NR	NR

[54]	F:3(11) NF:6(8)	F:39.1(8.9) NF:37.6(6.6)	NR	F:6(1-40)* NF:8(3-22)*	F:1(0-1)* NF:1(0-1)*	F:8.9(10.8)mL NF:7.2(4.7)mL	NR	NR	NR	NR
[59]	F:4(11) NF:4(8)	F:37.3(4.0) NF:36.9(7.5)	RRMS	F:3.9(4.1) NF:7.1(3.9)	F:1(0-3)* NF:1(0-2)*	NR	BDI: F:9.3(3.5) NF:6.7(4.2)	NR	MFIS: F:42.1(7.3) NF:19.9(8.6)	NR
[39]	F:3(12) NF:4(11)	F:30.4(18-49)* NF:29.9(18-47)*	RRMS	F:2.8(1-7)* NF:3.7(1-9)*	F:1.5(0-1.5)* NF:1.5(0-1.5)*	NR	MADRS≤16	NR	Pyramidal score: F:1(0-1)* NF:1(0-1)*	NR
[81]	F:3(19) NF:8(19)	F:31.86(6.84)) NF:30.18(6.96)	RRMS	F:7(4.82) NF:5.62(4.79)	F:2.75(1.5-4)* NF:1.5(0-3.0)*	NR	ZDS: F:39.77(8.06) NF:33.59(7.47)	PASAT: F:30.90(12.50) NF:35.88(11.93) SDMT: F:47.27(11.80) NF:54.59(13.28)	EQ5D: F:0.69(0.20) NF:0.85(0.13) Pyramidal score: F:2(1-3)* NF:1(0-2) 9HPT: F:23.94(4.57)s NF:21.56(3.89)s T25FW: F:5.17(0.68) NF:4.48(0.76)	F: 7% Intramuscular IFN β-1a 8% Subcutaneous IFN β-1b 4% Subcutaneous IFN β-1a 3% Subcutaneous GA NF: 9% % Intramuscular IFN β-1a 8% Subcutaneous IFN β-1b 4% Subcutaneous IFN β-1a 4% Subcutaneous GA 1% Natazumab 1% untreated

[82]	F:1(10) NF:0(6)	F:38(20-49)* NF:26.5(20-47)*	RRMS	F:4.1(0.3-15.5)* NF:3.15(0.7-4.1)*	F:2(0-3)* NF:1.5(1-2)*	F:10.56(1.18-40.51)* cm3 NF:3.15(1.40-15.75)* cm3	MADRS: F:7(2-19) NF:9(0-18)	NR	Mattis score: F:140(133-142)* NF:139.5(134-142)*	NR
[62]	F:15 NF:14 (20W 9M)	F:39.2(8.2) NF:37.6(6.6)	RRMS	F:7(1-40)* NF:6.5(2-10)*	F:1(0-1)* NF:1(0-1)*	MS:8.1(1.1-41.7)*ml	MADRS<16	NR	9HPT: F:20.2(2.7) NF:20.5(2.5) Max finger tapping rate: F:3.4(0.7) NF:3.5(0.5)	NR
[55]	F:32(49) NF:28(38)	F:42.8(11) NF:40.5(10.5)	RRMS:91 PPMS:10 SPMS:22 Others:24	F:13.3(9.1) NF:12.1(6.7)	F:3.5(1-7)* NF:2.5(0-7)*	F:8.9(10)mL NF:8.4(8)mL	MADRS<9	PASAT F:35.9 (0-60) NF:36.5(0-59)	NR	F:57 NF:37
[56]	F:26(38) NF:26(33)	F:42.3(10.3) NF:41(10.5)	RRMS:80 PPMS:8 SPMS:17 Others:18	F:13.1(1-44)* NF:11.9(1-32)*	F:2.5(1-7.0)* NF:1.5(0-7.0)*	F:9.7(10.7) NF:8.8(8.3)	MADRS<9	PASAT F:35.7(1-59) NF:37.6(1-59)	NR	F: 22 IFN, 8 Copaxone 6 Fg 4 Tys, 3 others NF: 15 IFN, 7 Copaxone, 7 Fg, 5 Tys, 0 Others
[61]	F:11(21) NF:10(18)	F:37.72(5.90) NF:34.96(5.87)	RRMS	F:7.44(5.15) NF:5.14(3.69)	F:3.20(1.68) NF:2.21(1.20)	F:6.03(14.02) mL NF:3.16(3.97) mL	CDMI Total score: F:96.14(29.90) NF:64.11(16.23)	NR	NR	NR
[70]	CF:10(27) CNF:2(10)	CF:47.2(10.7) CNF:43.8(10.8)	RRMS	CF:9.1(7) CNF:23(11.2)	CF:3.2(1.5) CNF:4.1(2.7)	NR	BDI: CF:13.4(8.5) CNF:5.7(3.3)	NR	NR	F:82% Immunomodulatory treatment NF:72% Immunomod

										ulatory treatment
[98]	F:4(14) NF:18(24)	F:43.1(6.3) NF:42.9(11.7)	MS:95 RRMS:69 PPMS:9 SPMS:17	F:6.8(6) NF:7.8(8.6)	F:3.4(2.2) NF:3.1(1.8)	NR	BDI: F:9.9(2) NF:5.3(1.8)	PASAT: F:39(12.3) NF:45.4(11.2)	9HPT: F:26.5(11) NF:25.4(8.1) TWT: F:7.3(3.3) NF:5.8 Alertness without cueing F:261.1(39.9) NF:246.6(46.2)) Alertness with cueing: F:248.9(38.6) NF:242.1(43.5)	NR
[72]	CF:20 CNF:14 (15M 31W)	CF:49.2(7.4) CNF:44(12.9)	RRMS, SPMS	CF:14.4(6.85) CNF:10.4(7.4)	CF:3.8(1.5) CNF:2.5(1.9)	NR	BDI: CF:3.5(3.0) CNF:2.7(2.5)	NR	MSFC: CF:-0.2(0.5) CNF:0(0.5)	NR
[71]	CF:19(48) CNF:43(11)	CF:49(10) CNF:43(11)	RRMS, SPMS	CF:12.8(7.3) CNF:10.25(7.1))	CF:3.7(2) CNF:3.3(3)	NR	BDI mental: CF:8(6) CNF:3(3) BDIIsomatic: CF:6(3) CNF:4(4)	NR	NR	NR
[63]	F:13(23) NF:37(49)	F:44.3(12.4) NF:35(11.4)	F: RRMS:25 Progressive:1 1 NF: RRMS:75 Progressive:1 1	F:13.4(9.8) NF:10.8(6.2)	F:4(0-6.5)* NF:1.5(0-8)*	F:9(8.3)mL NF:5.7(5.3)mL	NR	BRB-N battery Data NR	NR	F:7 untreated, 14 Glatiramer acetate/IFN, 15Natalizum

										ab/fingolimod NF: 10 untreated, 30 Glatiramer acetate/IFN, 43 Natalizumab /fingolimod NR
[89]	F: 174 NF: 192	F vs NF: 4.62 (2.37, 6.86)**	F: RRMS:93, PMS: 82 NF: RRMS:146 PMS: 46	F vs NF: 0.4 (- 1.17, 1.97)**	F vs NF: 0.36 (0.12, 0.59)**	F vs NF: _0.03 (0.14, 0.07)**	MADRS: F vs NF: 8.02 (6.35, 9.7)**	PASAT-3: F vs NF: _0.16 (0.47, 0.15)**	NR	
[52]	F:7(9) NF:4(13)	F:41.1(10.9) NF:38(9.4)	RRMS	F:8.4(3.4) NF:7.9(3.8)	F:1.8(0.6) NF:1.6(0.6)	NR	17-HDRS: F:6.4(4.8) NF:6.1(4.6)	MMSE<24	NR	MS: 32 immunomodulatory (interferon-beta-1, glatiramer acetate) or immunosuppressive therapy (azathioprine).
[83]	F:20 NF:11 (12M 40W)	MS:39(32- 43)*	RRMS	MS:9(3-14)*	MS:2.5(2- 3.5)*	NR	NR	NR	NR	MS: 8glatiramer acetate
[57]	F:9(18) NF:9(12)	F:38.37(7.56)) NF:40.67(10 .39)	RRMS:44 SPMS:5	F:9.87(5.86) NF:8.52(6.46)	F:2.51(1.45) NF:2.24(2.02)	NR	BDI F:12.70(5.96) NF:4.62(3.46)	NR	tSTAI: F:55.89(7.58) NF:38.80(9.74)	39 MS: glatiramer acetate, beta- interferon
[99]	F:23(77) ReversibleF:2 5(75) NF:19(81)	F:48.5(9.2) ReversibleF :51.2(10) NF:51.5(7)	F:RRMS:85% SPMS:15% ReversibleF: RRMS:90% SPMS:10%	F:18.1(6.9) ReversibleF:1 5.9(7.6) NF:16.8(8.2)	F:2.3(1.6) ReversibleF:2 .1(1.7) NF:1.6(1.6)	NR	CES-D≥16 F:14 ReversibleF:5 NF:1	NR	NR	NR

			NF:RRMS:93 % SPMS:7%							
[84]	F:20(80) ReversibleF:2 6(74) NF:22(78)	F:48.9(8.9) ReversibleF: :49.5(9.8) NF:49.4(6.7)	F:RRMS:87% SPMS:13% Reversible F:RRMS:84% SPMS:13% PPMS:3% NF:RRMS:89 % SPMS:11%	F:17.7(6.6) ReversibleF:1 6.9(8) NF:17(8.1)	F:2.3(1.5) ReversibleF:2 .0(1.8) NF:1.8(1.0)	NR	CES-D>16 F:15.9(8.7) RF:8.8(7) NF:5.8(4.2)	NR	NR	F: 87%disease- modyfyng treatment 2monthly intravenous steroids, 1 on immunosup pressant. ReversibleF: 80%disease- modifying treatment 2monthly intravenous steroids NF: 92%disease- modifyinf treatment, 1 immunosup pressant NR
[58]	F:6(20) ReversibleF: 6(19) NF:8(34)	F:48.5(9.2) Reversible F: 51.2 (10) NF: 51.5(7)	F: RRMS:22 SPMS: 4 Reversible F: RRMS:22 SPMS: 3 NF: RRMS:39 SPMS: 3	F: 17.5(12-22)* Reversible F: 13 (12-16)* NF:14(11-21)*	F: 2(1.5-3)* Reversible F: 1.5(1-3)* NF:1.5(1-2)*	NR	CES-D≥16: F:17 Reversible F:8 NF:6	NR	NR	
[85]	F:8 NF:16 (7M 17W)	MS:45.4(9.7)	RRMS:20 SPMS:4	MS:12.6(8.4)	F:3(1-6.5)* NF:1.5(0- 4.5)*	MS:9.2(7.5)c m3	NR	NR	NR	NR
[97]	CF:7(4) CNF:7(4)	CF:46.6(9.3) CNF:40(5.8)	RRMS	CF:9.5(3.8) CNF:6(4.4)	CF:2.5(0-3.5) CNF:1.5(0-3)	CF:9.1(1.4)m L CNF:3.9(6.9) mL	BDI≤10	PASAT: CF:81.2(47- 118)	NR	NR

								CNF:103.6(73-118)		
[40]	F:4(6) NF:6(8)	F:38(7.7) NF:38.6(8.5)	RRMS	F:8.2(6.2) NF:10.6(6.6)	F:1.5(1.5-2)* NF:1.5(0-1.5)*	F:7.7(5)mL NF:8.9(10.7) mL	MADRS Data NR	NR	NR	NR
[65]	F:12 NF:10 (5M 17W)	F:34.1(22-42)* NF:33.1(21-44)*	RRMS	F:6(2-15)* NF:5(2-11)*	F:1(0-3)* NF:1(0-2)*	NR	MADRS<16	NR	9-HPT: F:22(19-24)* NF:20(17-22)* Finger tapping rate: F:3.2(2.6-4)* NF:3.5(2.5-3.8)* Foot tapping rate: F:3.2(2.6-4)* NF:3.1(2.6-3.8)*	NR
[66]	F:1(10) NF:1(12)	F:33.8(6.2) NF:31.2(4.3)	RRMS	F:6(2-12)* NF:6(2-10)*	F:1(0-1.5)* NF:1(0-1.5)*	F:8.1(8.5)ml NF:8.8(6)ml	MADRS<9	NR	FSS: F:37.7(7.7) NF:15.6(4.8)	MS: 3 glatiramer acetate; 21 interferon beta NR
[91]	F:6(14) NF:8(7)	F:38.8(29-65)* NF:38.8(29-60)*	RRMS	F:10.5(2-23)* NF:11.2(0.5-27)*	F:3.5(1.5-5.5)* NF:3(0-5)*	NR	MADRS≤16	NR	NR	NR
[76]	F:14(17) NF:15(17)	F:41(23-63) NF:39.5(27-58)	F: RRMS:26 SPMS:5 NF: RRMS:30 SPMS:2	F:13(0.6-32) NF: 11.65(0.8-25.5)	F:2.5(1-5.5) NF:2(1-6.5) (median)	F:8.5(8.1) NF:8.7(9.7)	MADRS F:8(1-17)* NF:10(3-17)*	PASAT Data NR	NR	F:9interferon s, 5glatiramer acetate, 7fingolimod, 4Natalizuma b NF:14Interfe rons, 2Glatiramer acetate,

										3Fingolimod, 5Natalizuma b
[64]	F:17(33) NF:10(19)	F:42.6(11.2) NF:40(9.1)	RRMS	F:12.9(8.2) NF:10.6(7.6)	F:2(1-4)* NF:1.5(0-4)*	F:6.2(7.5)mL NF:5.7(6)mL	MADRS<9	BRB-N<2	9-HPT: F:25(6.5) NF:24.7(5.3) Finger tapping rate: F:3.5(0.7) NF:3.5(0.7)	NR
[67]	F:8(11) NF:7(9)	F:43(8) NF:42(10)	F: RRMS:9 Others:10 NF: RRMS:10 Other:6	F:10(8) NF:14(8)	F:3.6(1.3) NF:3.9(1.7)	NR	BDI: F:15.6(8) NF:5.2(3.6)	NR	NR	NR
[79]	CF:10(18) CNF:5(9)	CF:50.5(8.8) CNF:42.8(12.8)	CF: RRMS:18 SPMS:10 CNF: RRMS:12 SPMS:2	NR	T1: CF: 4.14(1.52) CNF: 2.63(2.12) T2: CF: 3.70(1.46) CNF: 3.42(2)	NR	BDI Data NR	PASAT Data NR	MSFC: T1: CF:-0.15(0.53) CNF:-0-01(0.48) T2: CF:-0.02(0.50) CNF:0.09(0.60)	CF: 15.4%untreated, 53.8%interferons, 30.8%escalated medications CNF: 46.7%non medication, 40%interferons, 13.3%escalated medications
[86]	F:43 NF:17 (22M 38W)	MS:36.4(9)	CIS:22 RRMS:28 SPMS:5 PPMS:5	MS:2.66(1-36)*	MS:2(0-7)*	MS:34.57(1.2-175.9)*cm3	Cummings' Neuropsychiatric Inventory, the Hamilton's Depression Rating Scale (<8 points), Hamilton's Anxiety	SDMT, PASAT Data NR	MSFC: MS:0.64(0.76) BRB-N	NR

							Rating Scale (<6 points BDIS<16			
[68]	F:12 NF:12 (4M 20W)	F:40.9(8.9) NF:38.7(8.1)	RRMS	MS: 7	F:1.5 NF:1.5	NR		MMSE<24	MSFC MSQOL-54 Data NR Motor performance Data NR	NR
[69]	F:3(7) NF:6(6)	F:27(5.5) NF:25.8(5.4)	RRMS	F:5.5(3.8) NF:5.8(3.8)	F:2.3(0-6)* NF:1.16(0-4)*	F:4.7(2.8) NF:12.4(19.6)	BDI F:3.3(2.3) NF:1(1.8)	NR		NR
[92]	F:6(21) NF:8(9)	F:36.7(9.7) NF:34.5(8.3)	RRMS	F:6.2(4.5) NF:6.4(6.4)	F:2.5(0.8) NF:2(1.1)	NR	BDI-II F:9.7(6.2) NF:3.4(3.3)	PASAT: F:48.8(8.4) NF:52.2(5.3) SDMT: F:53.5(9.3) NF:55.4(12.3)	PSQI: F:5.7(4.5) NF:4.4(1.7) ESS: F:9(3.5) NF:6.8(4.3) JTHFT: F: 37.9(5.1) NF:37.3(2.4) 9-HPT: F:15.9(2.1) NF:16(2)	NR
[93]	F:34 NF:26	F:42.12(6.9) NF:38.09(10 .2)	F:RRMS:26 SPMS:8 NF:RRMS:20 SPMS:6	F:10.59(7.3) NF:10.35(9.5)	F:3.81(2.2) NF:2.69(2.2)	F:13.44(13.4)c m3 NF:11.24(13.2)cm3	NR	NR	NR	NR
[87]	F:25 NF:197	F:39(9.18) NF:34(9.05)	RRMS	F:10(6.6) NF:6(5.7)	EDSS≤2	F:17486(1673 6.5) NF:7119.8(65 71.5)	NR	NR	NR	NR
[94]	F:4(13) NF:3(10)	F:38.5(7.6) NF:37.8(9.8)	RRMS	F:9.3(7.3) NF:7(6.2)	F:2.5(1-3)* NF:1.5(0-3)*	NR	BDI F:12.2(8.9) NF:5.6(6.4)	NR	NR	NR
[51]	F:3(8) NF:3(6)	F:38.5(3.2) NF:35.9(7.8)	RRMS	MS:4.7(3.8)	F:0.4(0.5) NF:0.3(0.5)	F:11(8,3)cm3 NF:17.2(8.1)c m3	BDI F:8.3(3.2) NF:6.2(4.3)	NR	9-HPT F:19.2(3.2) NF:19.1(2.1)	F:5 INF betaIb, 3 INF beta Ia, 1

[75]	F:8(30) NF:15(26)	F:34.5(20-58)* NF:30(17-54)*	RRMS	F:2(0-10)* NF:2(0-10)*	F:1.50(0-5.5)* NF:0.50(0-3.5)*	F:3.54(0.38-41.18)*mL NF:1.85(0.14-30.58)*mL	HADS≤10	SDMT: F:-0.65(-3.67-2.04) NF:-0.19(-2.46-2.22) TAP-alertness: F:0(-2-1.30) NF:0.10(-1.60-2) PASAT-3: F:-0.39(-4.74-1.1) NF:0.04(-3.23-1.31) Bloc span: F: -0.20 (-1.50 to 2.00) NF:0.20 (-1.60-2.40) VLMT Dg 5: F:0.13(-2.48-1.17) NF:0.36 (-1.44-1.17) VLMT Dg7: F: 0.23 (-2.74-1.28) NF:0.63(-1.40-1.43) VLMT recognition:	NR	Natalizumab, 1 no untreated. NF:2 INF beta Ib, 6 INF beta Ia, 2 Cop-I, 1 untreated F: 10 untreated, 10 interferons, 8 glatiramer acetate, 6 natalizumab, 3 fingolimod, 1 dimethylfumarate NF: 14 untreated, 15 interferons, 5 glatiramer acetate, 6 natalizumab, 1 fingolimod, 0 dimethylfumarate
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F:0.08(−4.01-0.94)
NF:0.39(−2.13-0.78)
TMT-A: F: −0.20 (−3.00-1.50)
TMT-B: F: −0.13 (−3.00-1.26)
RWT lexical:
F: −0.30 (−2.00-1.60)
NF: 0.30 (−2.00-1.60)

[95]	F:10 NF:9(17)	F:42(8) NF:38(5)	RRMS	NR	F: 1.8(1-2.5)* NF:1.5(1-1.5)*	NR	BDI Data NR	NR	NR	NR
[83]	F:4(19) NF:1(8)	F:40(32-42.5)* NF: 36(32-39)*	RRMS	F:10(3.5-12.5)* NF:6(2-12m)*	F:3(2.5-4)* NF:2(2-2.5)*	F:3.53(1.66-11.72)*cm3 NF:3.94(1.98-4.83)*cm3	NR	NR	NR	NR

*Note. The data reported the mean (SD) value. *indicate the range instead of SD.*

Legend. BRB-N battery: Brief Repeatable Battery of Neuropsychological Tests; CA: central activation; CF: patients with cognitive fatigue; CNF: patients without cognitive fatigue; EC-AS: exteroceptive condition-accuracy score; EDSS: expanded disability status scale; EQ5D: EuroQol-5D quality of life questionnaire; ESS: Epworth sleepiness scale; F patients with fatigue; FSS: Fatigue Severity Scale; HADS: Hospital anxiety and depression scale; 9-HPT: 9-Hole peg Test; IC-AS: Interoceptive Condition-accuracy score; IFN: interferon; JTHFT: Jebsen-Taylor hand function test; MS: patients affected by multiple sclerosis; MSFC: Multiple Sclerosis functional composite; MSQOL-54: Multiple Sclerosis Quality of Life-54; MFIS: modified fatigue impact scale; MS: patients affected by Multiple Sclerosis; MSSS: Multiple sclerosis severity score; NF patients without fatigue; NR not reported; PSQI: Pittsburgh sleep quality index; TAS: Toronto alexithymia scale; tSTAI: Trait part of the Spielberger State Trait Anxiety Inventory; TWT: timed walk test; T25FW: timed 25-foot walk test; T1: time 1; T2: time 2.

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