MusicTherapy for motor and non-motor symptoms in Parkinson's disease: a 24-week, randomized, controlled, single-blinded study

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Background

Parkinson's disease (PD) affects mobility, cognition and emotions. Music Therapy (MT) is considered an alternative neuro-rehabilitative technique for PD patients due to its action on motor and non-motor symptoms

Aim of the study

The aim of this prospective, randomized, controlled, single-blinded study is assessing the effectiveness of MT on motor symptoms, cognition and mood in PD patients

Patients and methods

27 consecutive PD patients were enrolled and randomly assigned to MT or no treatment (NT). All patients were neither depressed nor demented, with mild/moderate PD (H&Y stage ≤ 2). At baseline (T0), at the end of MT program (6 months, T1) and 6 months after the end of MT program (12 monthes, T2), all patients were evaluated for quality of life (Parkinson Disease Questionnaire-39, PDQ-39) and underwent a detailed motor (MDS-Unified Parkinson's Disease Rating Scale; New Freezing of Gait – Questionnaire; Timed Up and GO test, TUG) and neuropsychiatric assessment (Beck Depression Inventory and a neuropsychological exam evaluating executive function, attention, visuospatial skills, memory and language). MT session were held once a week for 24 weeks; each session lasted 90 minutes and consisted in production of music, singing and dancing.

Statistical analysis

Baseline demographic, clinical, motor and neuropsychological features comparisons between MT and NT groups were assessed by Mann-Whitney test. MT and NT variations within each group over time were assessed by means of Wilcoxon test.

Results

Two patients randomized to MT interrupted early the therapy and were excluded from the analysis wich therefore included 25 patients (10 MT and 15 NT). At T0 the two groups were comparable for demographic, quality of life and motor measures, whereas they differed on some neuropsychological tests, namely names denomination (p=0.028) and Trial Making Test (TMT) A (p=0.056). At T1 vs T0, MT patients showed significant improvement on PDQ-39 (p=0.03), verbal fluency (p=0.03), Stroop interference (p=0.03), Rey delayed recall (p=0.02); and improvement as a trend on TUG (p=0.06) and TMT A (p=0.05) and B (p=0.059), whereas NT patients did not show significant difference on any motor and neuropsychiatric measure. At T2 as compared with T1, MT patients did not show any significant worsening at neuropsychological assessment, but they did not reach significant improvement while comparing T0 and T2 cognitive data, probably due to partial loss of effectiveness in absence of treatment. Furthermore, MT patient showed significant worsening on TUG 1, 2 and 3 while comparing T2 and T1, nevertheless they did not worsen significantly while comparing T0 and T2 motor results. At T2 as compared with T1, NT group did not showed significant difference on cognitive measures at any time (T1 vs T2 and T0 vs T2), whereas they displayed significant worsening on TUG 1 and 3 and in PDQ-39 while comparing T2 and T0.

Table. 2. Motor scores, quality of life and cognitive features of PD patients randomized to music therapy program (MT) or to no intervention (NT) at follow up (T1 and T2) and within groups comparisons

	T1		NT	MT	T2		NT	MT	NT	MT
	MT	NT	T1 vs T0	T1 vs T0	MT	NT	T2 vs T1	T2 vs T1	T2 vs T0	T2 vs T0
BDI II	11,7 ± 9,21	9,33 ± 6,70	NS	NS	12,10 ± 11,70	9,22 ± 5,87	NS	NS	NS	NS
NFOG	4 ± 5,35	4,92 ± 7,53	NS	NS	5,30 ± 7,63	3,67 ± 7,29	NS	NS	NS	NS
TUG1	9,9 ± 2,53	10,13 ± 1,76	p=0,024	NS	10,85 ± 2,68	9,5 ± 1,44	NS	p=0,02	p=0,016	NS
TUG2	11,3 ± 3,74	11,08 ± 2,34	NS	NS	12,55 ± 3,81	10,61 ± 1,71	NS	p=0,013	NS	NS
TUG3	11,05 ± 3,24	11,62 ± 2,38	NS	NS	13,05 ± 3,57	11,28 ± 2,05	NS	p=0,009	p=0,032	NS
UPDRS1	8 ± 4,55	8,33 ± 4,76	NS	NS	9,20 ± 4,8	7,9 ± 3,8	NS	NS	NS	NS
UPDRS2	9,2 ± 8,39	8,75 ± 6,25	NS	NS	10,1 ± 7,61	10,22 ± 7,46	NS	NS	NS	NS
UPDRS3	17,6 ± 9,40	15,33 ± 7,25	NS	NS	17,2 ± 7,82	15,44 ± 4,36	NS	NS	NS	NS
PDQ-39 Total Score	22,12 ± 18,81	18,75 ± 11,58	NS	p=0,037	25,96 ± 17,66	21,94 ± 14,50	NS	p=0,017	NS	NS
Mobility PDQ-39	21,25 ± 21,64	16,46 ± 14,44	NS	NS	31,25 ± 23,01	22,5 ± 24,3	NS	p=0,034	p=0,028	p=0,026
ADL PDQ-39	19,66 ± 26,89	15,29 ± 15,84	NS	NS	22,9 ± 27,1	29,65 ± 26,44	NS	NS	NS	NS
Emotional WB PDQ-39	31,27 ± 23,36	23,28 ± 18,26	NS	p=0,028	30,86 ± 22,43	25,48 ± 18,35	NS	NS	NS	NS
Stigma PDQ-39	24,38 ± 27,55	15,10 ± 24,20	NS	NS	22 ± 33,31	22,22 ± 18,25	NS	NS	NS	NS
Social Support PDQ-39	7,08 ± 12,44	9,03 ± 13,03	NS	NS	14,18 ± 21,19	4,63 ± 11,12	NS	NS	NS	NS
Cognitions PDQ-39	24,38 ± 21,54	25 ± 19,03	NS	NS	28,13 ± 20,89	13,19 ± 13,05	p=0,041	NS	p=0,024	NS
Communication PDQ-39	15,85 ± 14,94	12,50 ± 13,53	NS	NS	20,01 ± 16,3	18,53 ± 15,48	NS	NS	NS	NS
Bodily Discom PDQ-39	26,68 ± 22,51	36,13 ± 15,54	p=0,07	NS	29,19 ± 15,85	29,65 ± 17,25	NS	NS	p=0,018	NS
FAB	13,20 ± 3,01	14 ± 2,56	NS	NS	12,1 ± 2,6	14,89 ± 1,83	NS	NS	NS	NS
REY immediate recall	39,9 ± 13,27	45,42 ± 8,42	p=0,013	p=0,011	37,5 ± 11,31	45,78 ± 13,60	NS	NS	NS	NS
REY delayed recall	8,9 ± 3,81	9,42 ± 3,26	NS	p=0,028	8,4 ± 3,5	9 ± 2,78	NS	NS	NS	NS
Phonemic Verbal Fluency	32,10 ± 11,92	38,58 ± 11,34	NS	p=0,032	29,2 ± 10,28	30 ± 8,41	p=0,011	NS	NS	NS
Raven Test	21,9 ± 4,77	27,33 ± 5,61	NS	NS	21,8 ± 5,22	27,33 ± 5,5	NS	NS	NS	NS
Names denomination	9,3 ± 0,68	9,83 ± 0,39	NS	NS	9,4 ± 0,97	9,67 ± 0,7	NS	NS	NS	NS
Verbal denomination	7,7 ± 1,49	8,58 ± 0,67	NS	NS	7,7 ± 1,25	8,22 ± 0,97	NS	NS	NS	NS
Stroop Color test	38,5 ± 11,09	37,33 ± 5,89	NS	NS	36,7 ± 9,7	38 ± 7,35	NS	NS	NS	NS
Stroop C/W test	18,20 ± 5,61	19,17 ± 4,24	NS	p=0,028	7,6 ± 8,15	20 ± 7,09	NS	NS	NS	NS
Clock drawing test	9,3 ± 2,31	10 ± 1,76	NS	NS	9 ± 3,2	10,25 ± 2,44	NS	NS	NS	NS
Trail Making Test A	64,20 ± 37,24	37,17 ± 16,39	NS	p=0,047	75,7 ± 53,75	50,67 ± 30,7	NS	NS	NS	NS
Trail Making Test B	161,8 ± 82,75	116,17 ± 54,64	NS	p=0,059	118,1 ± 69,19	113,44 ± 13,22	NS	NS	NS	NS
Trail Making Test BA	101 ± 52,92	79 ± 48,5	NS	NS	65 ± 55,2	63,11 ± 33,37	NS	NS	NS	NS

BDI II: Beck Depression Inventory II; TUG: Timed Up and Go Test; UPDRS: Unified Parkinson's Disease Rating Scale; Emotional WB: Emotional Well-being; FAB: Frontal Assessment Battery; Stroop C/W: Stroop Color Word Test

Conclusions

Our preliminary data suggest that MT might represent an effective tool for a holistic treatment of PD with a main effect on frontal functions. Our data suggest that MT program should be continued over time, given the partial loss of effectiveness after its interruption