

Additional file 5

Study characteristics first search

Table S1. Study characteristics first search

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Aguilar et al., 2014 [86]	RCT	n _r =40 n _a =34	n.r.	CG	71%	74.7 (7.4)	20.8 (4.0)	AD	Rivastigmine transdermal patch
				IG	77%	78.6 (8.4)	20.1 (4.5)		Rivastigmine transdermal patch + exercise (aerobic, flexibility, strength, balance; 2x/week, 40min)
				All	74%	n.r.	n.r., range: n.r.		6 months
Arcoverde et al., 2014 [56]	RCT	n _r =20 n _a =20	Outpatient unit	CG	50%	79.0 (n.r.)	19.9 (3.4)	AD, MD	No intervention
				IG	60%	78.5 (n.r.)	20.4 (2.7)		Treadmill walking (2x/week, 30min)
				All	n.r.	n.r.	n.r., CI ₉₅ : 15-25		3 months
Bossers et al., 2015 [50]	RCT	n _r =123 n _a =109	Care facility	CG	69%	85.4 (5.0)	15.9 (4.2)	AD, VD, MD, unknown	Social visits (4x/week, 30min)
				IG1	78%	85.7 (5.1)	15.8 (4.3)		Strength + walking (4x/week, 30min)
				IG2	78%	85.4 (5.4)	15.2 (4.8)		Walking (4x/week, 30min)
				All	n.r.	85.5 (5.1)	n.r., range: 9-23		9 weeks
Bossers et al., 2016 [112]	RCT	n _r =118 n _a =105	Care facility	CG	69%	85.7 (4.8)	15.9 (4.3)	AD, VD, MD, unknown	Social visits (4x/week, 30min)
				IG1	77%	85.7 (5.2)	15.9 (4.4)		Strength + walking (4x/week, 30min)
				IG2	77%	85.5 (5.4)	15.3 (4.8)		Walking (4x/week, 30min)
				All	n.r.	85.6 (5.1)	n.r., range: 9-23		9 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Burgener et al., 2008 [65]	RCT	n _r =43 n _a =33	n.r.	CG	47%	76.0 (8.1)	22.9 (5.2)	AD, VD, MD, LBD, FLD	Attention-control educational program
				IG	46%	77.9 (7.9)	24.8 (3.5)		Taiji exercise (3x/week, 60min), cognitive-behavioural therapy, support group (both bi-weekly, 90min)
				All	47%	77.0 (n.r.)	n.r., range: n.r.		20 weeks
Cancela et al., 2016 [82]	RCT	n _r =189 n _a =189/114*	Care facility	CG	81%	82.9 (7.4)	n.r.	n.r.	Non-physical distractive recreational activities
				IG	44%	80.6 (8.3)	n.r.		Cycling (daily, min. 15min)
				All	67%	n.r.	n.r., range: n.r.		15 months
Christofolotti et al., 2008 [66]	RCT	n _r =54 n _a =41	Long-term psychiatric institution	CG	70%	79.4 (2.0)	14.6 (1.2)	MD	No motor intervention
				IG1	65%	70.0 (1.8)	18.7 (1.7)		Physiotherapy, occupational therapy, physical education (5x/week, 120min)
				IG2	71%	72.9 (2.3)	12.7 (2.1)		Physiotherapy (3x/week, 60min)
				All	69%	74.3 (1.4)	n.r., range: n.r.		6 months
Cott et al., 2002 [124]	RCT	n _r =86 n _a =74	Care facility	CG	42%	79.8 (8.3)	6.31 (7.46)	AD	No intervention
				IG1	53%	83.2 (8.3)	6.16 (6.16)		Conversation while walking (5x/week, 30min)
				IG2	60%	81.7 (7.4)	5.44 (5.98)		Conversation (5x/week, 30min)
				All	53%	82 (8)	6 (6), range: 0-21		16 weeks
Dawson et al., 2019 [74]	RCT	n _r =23 n _a =23	Community-dwelling	CG	70%	74.0 (10.4)	22.0 (3.1)	n.r.	No intervention
				IG	46%	73.8 (8.5)	19.9 (6.1)		Moderate-intensity home-based functional exercise (strength, balance; 2x/week)
				All	57%	73.9 (9.1)	20.8 (5.0), range: 9-28		12 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Francese et al., 1997 [76]	RCT	n _r =12 n _a =11	Care facility	CG	n.r.	n.r.	n.r.	AD	Watching a music video sing-a-long (3x/week, 20min)
				IG	n.r.	n.r.	n.r.		Exercise (3x/week, 20min)
				All	n.r.	n.r.	n.r.		7 weeks
Hauer et al., 2017 [77]	RCT	n _r =34 n _a =28	Post-ward geriatric rehabilitation	CG	71%	83.3 (5.7)	18.2 (4.4)	n.r.	Usual care
				IG	65%	81.4 (6.6)	19.5 (4.6)		Postural control and strength home training (at least once per day)
				All	n.r.	81.9 (5.7)	18.8 (4.7), range: n.r.		6 weeks
Hauer et al., 2012 [78]	RCT	n _r =122 n _a =107	Outpatient geriatric rehabilitation	CG	73%	82.9 (7.0)	21.9 (3.2)	AD, VD, other	Motor placebo group training (2x/week, 60min)
				IG	74%	82.3 (6.6)	21.7 (2.8)		Progressive resistance and functional training (2x/week, 120min)
				All	n.r.	n.r.	n.r., range: n.r.		3 months
Henskens et al., 2018 [113]	RCT	n _r =87 n _a =87/ 16*	Care facility	CG1	77%	84.7 (4.6)	10.2 (5.7)	AD, VD, MD, other/ unknown	Social activity
				CG2	77%	85.1 (4.6)	12.1 (6.4)		Multicomponent aerobic and strength exercise (3x/week, 30-45min)
				IG1	91%	86.1 (5.9)	13.2 (3.7)		Activities of daily living training + social activity
				IG2	63%	87.0 (7.2)	13.6 (5.6)		Activities of daily living training + multicomponent aerobic and strength exercise (3x/week, 30-45min)
				All	n.r.	n.r.	n.r., range: n.r.		6 months

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Kampragkou et al., 2017 [83]	RCT	n _r =36 n _a =30	Hospitalised	CG	n.r.	n.r.	16.0 (3.0)	AD	Memory games (3x/week, 40min)
				IG	n.r.	n.r.	14.7 (3.1)		Aerobic exercise (3x/week, 30min), memory games, attention, speech, and music (3x/week, 10min)
				All	n.r.	n.r.	n.r., range: n.r.		12 weeks
Kemoun et al., 2010 [96]	RCT	n _r =38 n _a =31	Care facility	CG	73%	81.7 (5.1)	12.9	AD	No intervention
				IG	75%	82.0 (5.8)	12.6		Exercise (walking, equilibrium, stamina; 3x/week, 60min)
				All	74%	81.8 (5.3)	n.r., range: 7-20		15 weeks
Kim et al., 2016 [67]	RCT	n _r =38 n _a =31	Care facility	CG	86%	80.9 (6.1)	16.6 (4.0)	AD	Multicomponent intervention (5x/week, 2x/day, 60min)
				IG	68%	81.9 (7.0)	13.4 (4.2)		Lower-limb aerobic exercise (5x/week, 60min) + multicomponent intervention (5x/week, 2x/day, 60min)
				All	76%	81.5 (6.6)	14.8 (4.4), range: n.r.		6 months
Kovács et al., 2013 [79]	RCT	n _r =86 n _a =62	Care facility	CG	79	79.3 (12.7)	20.9 (3.8)	n.r.	Usual care including social activities
				IG	83	76.4 (9.4)	20.9 (3.2)		Exercise (strengthening, balance, walking; 2x/week)
				All	81%	n.r.	n.r., range: n.r.		12 months
Lam et al., 2018 [68]	RCT	n _r =54 n _a =54	Day-care facility	CG	78%	79.9 (6.7)	15.6 (4.5)	n.r.	Routine program including 30-60min of exercise (2x/week)
				IG	70%	79.7 (5.5)	13.6 (4.7)		Routine program including 30-60min of exercise + whole-body vibration training (4-6min + rest, 2x/week)
				All	74%	79.8 (6.1)	n.r., range: n.r.		9 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Miu et al., 2008 [57]	RCT	n _r =85 n _a =82	Community-dwelling	CG	63%	78 (6)	Median=20	AD, VD, MD, PD	Conventional medical treatment
				IG	43%	75 (7)	Median=20		Aerobic exercise (treadmill, bicycle, arm ergometer, flexibility exercises; 2x/week, 45-60min)
				All	54%	76 (6)	Median=20, range: n.r.		12 weeks
Netz et al., 2007 [58]	RCT	n _r =29 n _a =24	Day-care facility	CG	n.r.	n.r.	n.r.	n.r.	Social activity
				IG	n.r.	n.r.	n.r.		Group physical activity (2x/week, 45min)
				All	52%	76.9 (6.7)	13.3 (5.8), range: n.r.		12 weeks
Padala et al., 2017 [69]	RCT	n _r =30 n _a =30	Community-dwelling	CG	40%	73.9 (7.1)	22.7 (2.3)	AD	Walking (5x/week, 30min)
				IG	33%	72.1 (5.3)	23.3 (2.2)		Wii-Fit (5x/week, 30min)
				All	37%	73.0 (6.2)	22.9 (2.2), range: n.r.		8 weeks
Padala et al., 2012 [70]	RCT	n _r =22 n _a =22	Care facility	CG	73%	81.6 (5.2)	24.9 (3.6)	AD	Walking (5x/week, 30min)
				IG	73%	79.3 (9.8)	22.6 (4.3)		Wii-Fit (5x/week, 30min)
				All	73%	n.r.	n.r., range: n.r.		8 weeks
Pedrinolla et al., 2018 [93]	RCT	n _r =53 n _a =34	Community-dwelling	CG	61%	79 (6)	21 (5)	AD	Standard cognitive treatment (3x/week, 90min)
				IG	63%	80 (7)	22 (5)		Aerobic and strength training (3x/week, 90min)
				All	62%	n.r.	n.r., range: n.r.		6 months

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Pitkälä et al., 2013 [109]	RCT	n _r =210 n _a =194	Community-dwelling	CG	37%	78.1 (5.3)	17.7 (6.2)	AD	Usual community care
				IG1	36%	78.3 (5.1)	18.5 (6.3)		Group-based exercise (2x/week, 60min)
				IG2	43%	77.7 (5.4)	17.8 (6.6)		Home-based exercise (2x/week, 60min)
				All	39%	n.r.	n.r., range: n.r.		12 months
Pomeroy et al., 1999 [125]	RCT	n _r =81 n _a =78	Community-dwelling	CG	74%	81.8 (8.4)	n.r.	AD, MD, MID, undefined	Non-physical activities
				IG	74%	82 (8.0)	n.r.		Physiotherapy (up to 10x 30min)
				All	74%	81.9 (n.r.)	n.r., range: n.r.		2 weeks
Roach et al., 2011 [105]	RCT	n _r =105 n _a =82	Care facility	CG	n.r.	88.2 (5.8)	9.4 (7.2)	AD	Conversation (5x/week, 15-30min)
				IG1	n.r.	89.2 (6.5)	8.7 (7.8)		Exercise (strength, flexibility, balance, walking; 5x/week, 25-50min)
				IG2	n.r.	87.3 (6.1)	12.2 (7.5)		Walking (5x/week, 15-30min)
				All	n.r.	88.2 (6.1)	10.2 (7.6), range: n.r.		16 weeks
Rolland et al., 2007 [89]	RCT	n _r =134 n _a =110	Care facility	CG	79%	83.1 (7.0)	7.9 (6.4)	AD	Routine medical care
				IG	72%	82.8 (7.8)	9.7 (6.8)		Exercise (walking, strength, balance, flexibility; 2x/week, 60min)
				All	75%	83 (7.4)	8.8 (6.6), range: n.r.		12 months
Santana-Sosa et al., 2008 [80]	RCT	n _r =16 n _a =16	Care facility	CG	63%	73 (4)	19.9 (1.7)	AD	Routine nursing/medical care
				IG	63%	76 (4)	20.1 (2.3)		Training program (resistance, flexibility, joint mobility, balance/ coordination; 3x/week, 75min)
				All	63%	n.r.	n.r., range: n.r.		12 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Schwenk et al., 2014 [94]	Quasi RCT	n _r =148 n _a =130	Geriatric hospital	CG	76%	83.9 (6.1)	22.2 (2.3)	n.r.	Usual care treatment (occupational therapy, speech therapy, physiotherapy including exercise)
				IG	84%	84.2 (6.2)	21.4 (2.6)		Usual care treatment (see above) + intensive exercise (2x daily, up to 60min)
				All	n.r.	n.r.	n.r., range: n.r.		During rehabilitation period, average: 18.1 (6.8) days
Schwenk et al., 2014 [95]	RCT	n _r =61 n _a =49	Outpatients	CG	63%	82.3 (7.9)	21.7 (2.9)	n.r.	Low-intensity motor placebo activity program (60min, 2x/week)
				IG	65%	80.4 (7.1)	21.0 (2.9)		Progressive resistance and functional group training (120min, 2x/week)
				All	64%	81.9 (7.5)	21.4 (2.9), range: n.r.		3 months
Schwenk et al., 2010 [126]	RCT	n _r =61 n _a =49	n.r.	CG	63%	82.3 (7.9)	21.7 (2.9)	n.r.	Unspecific low-intensity exercise (60min, 2x/week)
				IG	65%	80.4 (7.1)	21.0 (2.9)		Dual-task-based exercise training (120min, 2x/week)
				All	64%	81.9 (7.5)	21.4 (2.9), range: n.r.		12 weeks
Sobol et al., 2016 [84]	RCT	n _r =200 n _a =189	Community-dwelling	CG	39%	71.3 (7.3)	24.1 (3.8)	AD	Usual care
				IG	48%	69.8 (7.4)	23.8 (3.4)		Moderate-to-high intensity aerobic exercise (3x/week, 60min)
				All	44%	70.5 (7.4)	24.0 (3.6), range: n.r.		16 weeks
Souto Barreto et al., 2017 [90]	Cluster RCT	n _r =98 n _a =91	Care facility	CG	77%	86.9 (5.8)	10.8 (5.5)	AD, VD, MD	Social activity (2x/week, 60min)
				IG	93%	88.3 (5.1)	11.4 (6.2)		Multicomponent training (range of motion, coordination, balance strength, aerobic; 2x/week, 60min)
				All	86%	n.r.	n.r., range: n.r.		24 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Steinberg et al., 2009 [98]	RCT	n _r =27 n _a =27	Community-dwelling	CG	69%	74.0 (8.1)	15.5 (5.4)	AD	Home safety assessment
				IG	71%	76.5 (3.9)	20.1 (5.1)		Home-based exercise (aerobic, strength, balance, flexibility; daily)
				All	79%	n.r.	n.r., range: n.r.		12 weeks
Suttanon et al., 2013 [52]	RCT	n _r =40 n _a =40	Community-dwelling	CG	57%	80.5 (6.0)	21.7 (4.4)	AD	Home-based education program
				IG	68%	83.4 (5.1)	20.9 (4.7)		Home-based individually tailored exercise (balance, strength, walking; 5x/week)
				All	62.5%	81.9 (5.7)	n.r., range: n.r.		6 months
Tappen et al., 2000 [106]	RCT	n _r =71 n _a =65	Care facility	CG	n.r.	89.6 (6.5)	12.5 (5.9)	AD	Conversation (3x/week, 30min)
				IG1	n.r.	84.3 (7.5)	10.8 (6.0)		Walking combined with conversation (3x/week, 30min)
				IG2	n.r.	87.4 (5.9)	9.8 (6.0)		Walking (3x/week, 30min)
				All	84%	87 (n.r.)	10.8 (n.r.), range: 0-23		16 weeks
Telenius et al., 2015 [71]	RCT	n _r =170 n _a =160	Care facility	CG	75%	86.4 (7.8)	15.8 (5.0)	n.r.	Leisure activities (2x/week, 50-60min)
				IG	72%	86.9 (7)	15.6 (5.0)		Intensive strengthening and balance exercises (2x/week, 50-60min)
				All	74%	86.7 (7.4)	15.7 (5.0), range: n.r.		12 weeks
Toots et al., 2017 [91]	Cluster RCT	n _r =186 n _a =153	Care facility	CG	76%	85.9 (7.8)	14.4 (3.5)	AD, VD, MD, other	Seated attention control activity
				IG	75%	84.4 (6.2)	15.4 (3.4)		High-intensity functional exercise (strength, balance, mobility; 2-3x/week, 45min)
				All	76%	85.1 (7.1)	14.9 (3.5), range: n.r.		4 months

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Toots et al., 2016 [72]	Cluster RCT	n _r =186 n _a =167	Care facility	CG	76%	85.9 (7.8)	14.4 (3.5)	AD, VD, MD, other	Seated attention control activity
				IG	75%	84.4 (6.2)	15.4 (3.4)		High-intensity functional exercise (strength, balance, mobility; 2-3x/week, 45min)
				All	76%	85.1 (7.1)	14.9 (3.5), range: n.r.		4 months
Toulotte et al., 2003 [85]	RCT	n _r =20 n _a =20	n.r.	CG	n.r.	81.9 (4.1)	18.0 (5.4)	AD, PD, stroke, unknown	Daily routine
				IG	n.r.	81.0 (5.6)	14.7 (7.6)		Physical training (2x/week, 45min)
				All	n.r.	81.4 (4.7)	16.3 (6.5), range: n.r.		16 weeks
Venturelli et al., 2011 [107]	RCT	n _r =24 n _a =21	Care facility	CG	n.r.	85 (5)	12 (2)	AD	Routine care
				IG	n.r.	83 (6)	13 (2)		Walking program (4x/week, 30min)
				All	n.r.	84 (5)	n.r., range: n.r.		24 weeks
Vreugdenhil et al., 2012 [59]	RCT	n _r =40 n _a =40	Community-dwelling	CG	75%	74.7 (n.r.)	21.0 (6.3)	AD	Usual treatment
				IG	45%	73.5 (n.r.)	22.9 (5.0)		Community-based home exercise program (daily)
				All	60%	74.1 (n.r.)	22.0 (n.r.), range 10-28		4 months
Werner et al., 2017 [100]	RCT	n _r =97 n _a =80	Geriatric hospital, care facility, community dwelling	CG	78%	82.5 (5.7)	21.5 (3.0)	n.r.	Low-intensity motor placebo activity (2x/week, 60min)
				IG	71%	82.6 (6.1)	22.2 (2.9)		Motor learning exercise program on compensatory sit-to-stand maneuvers (2x/week, 90min)
				All	74%	82.5 (5.9)	21.9 (2.9), range: n.r.		10weeks
Wesson et al., 2013 [61]	RCT	n _r =22 n _a =21	Community-dwelling	CG	36%	80.9 (5.0)	22.5 (4.3)	n.r.	Usual care
				IG	46%	78.7 (4.2)	24.5 (3.1)		Strength and balance training exercises and home hazard reduction
				All	41%	n.r.	n.r., range: 15-29		12 weeks

Table S1. Study characteristics first search (*Continued*)

Reference	Study design	Sample size	Setting	Group	Sample characteristics			Aetiology of dementia	Intervention
					Gender [% female]	Age [years] Mean (SD)	MMSE Mean (SD)		
Wiloth et al., 2018 [54]	RCT	n _r =99 n _a =84	Geriatric hospital, care facility, community dwelling	CG	74%	82.2 (5.3)	21.7 (2.9)	n.r.	Supervised motor placebo group training (2x/week, 60min)
				IG	70%	82.7 (6.2)	22.2 (2.8)		Comprehensive motor-cognitive intervention program (game-based training using Physiomat, dual-task training, motor learning exercise program) (2x/week, 90min)
				All	72%	82.9 (5.8)	22.0 (2.9), range: n.r.		10 weeks
Yoon et al., 2013 [73]	RCT	n _r =30 n _a =20	Care facility	CG	n.r.	70.1 (12.2)	18.7 (1.2)	n.r.	Conventional physical therapy (5x/week, 30min) + cognitive activity (3x/week, 20min)
				IG	n.r.	77.9 (7.5)	18.0 (1.5)		Conventional physical therapy (5x/week, 30min) + cognitive activity combined with cycling (3x/week, 20min)
				All	n.r.	n.r.	n.r., range: 16-23		12 weeks

AD: Alzheimer's disease, CG: control group, CI₉₅: 95% confidence interval, FLD: Frontal lobe dementia, IG: intervention group, LBD: Lewy body disease, MD: mixed dementia (AD+VD), MID: multi-infarct dementia, MMSE: Mini-Mental State Examination, n_a: number of analysed participants, n_r: number of randomised participants, n.r.: not reported, PD: Parkinson's disease dementia, RCT: randomised controlled trial, SD: standard deviation, VD: vascular dementia

* Intention-to-treat analysis and complete-case analysis

References

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