Claudia Eckstein[1], Heinrich Burkhardt[2]
1 Network Ageing Research, University of Heidelberg, Germany.
2 Department of Geriatric Medicine, University Medicine Mannheim, Germany.

Identified multicomponent, non-pharmacological interventions and patient outcomes

No.	Study	Type of program (P = Prevention, M = Management)	Detection	Mode of health care supply	Physical environment	Social environment	Orientation	Cognitive stimulation	Sensory impairments	Fluid balance	Nutrition/eating/metabolism	Infection	Mobilization	Medication review	(Emergency) Surgery	Pain	Day-night rhythm	Monitoring	Staff-education	Sufficient oxygen supply	Additional interventions	Main patient outcomes
1	Allen et al. (2011)	P & M	Six-Item Screener, NU-DESC	Multidisciplinary/ interprofessional				X	X	X			X	X			X	X	X		Computerized treatment order set: with standardized diagnostic, procedures	• Incidence of delirium: IG[(1)]: 7.2% vs. CG[(2)]: 8.8% (1.6% difference; 95% CI=−5.9% to 9.1%) • Length of stay: IG[(1)] 4.0 vs. CG[(2)]: 7.6 days (3.6-day difference; 95% CI= 0.66 to 6.49) • Post-implementation outcomes: fewer deaths: 23% vs. 9.5%; transfers to ICU: 18% vs. 0%; fewer 30-day readmissions; 31% to 5%; higher percentage of post-implementation patients had antipsychotic medication administered during stay
2	Andro et al. (2012)	P	No routine screening; study-phase: CAM	Multidisciplinary/ interprofessional	X	X	X		X	X	X		X	X		X						• Incidence of delirium: IG[(1)] : 5.26% vs. CG[(2)]: 15.45%, (RR 0.34 CI 95% 0.15-0.78) • MMSE: Pre-phase: mean MMSE 14.3 ± 7.8; post-phase: mean MMSE 13.9 ± 6.9
3	Avendaño Céspedes et al. (2016)	P & M	CAM	Nurse-led intervention	X	X	X		X	X	X	X	X	X		X	X	X	X	X	Caregiver booklet	• Prevalence of delirium: IG[(1)]: 33.3% vs. CG[(2)]: 48.3% (RR 0.54; 95% CI 0.17–1.72) • Incidence of delirium: IG[(1)]: 14.3% vs. CG[(2)]: 41.4% (RR 0.24; 95% CI 0.06–0.99; p=.039) • Duration of delirium: IG[(1)]: 1.7 (range1-6) vs. CG[(2)]: 3.4 days (range 1-13) (p=.063) • Severity of delirium: IG[(1)]: 35.0 vs. CG[(2)]: 65.0 (mean difference 30.0, 95% CI 1.5-58.5, p=.040), but mean severity per day was higher in the IG[(1)] (21.1 vs. 18.6) • Mortality: delirious patients compared to patients without delirium at admission: 33.3% vs. 14.6%, but without differences in: IG[(1)] and CG[(2)] • Length of stay: patients with delirium compared to those without delirium: 7.7 (SD 4.1) vs. 7.1 (SD 4.2) days
4	Benedict et al. (2009)	P	NEECHAM (modified)	Multidisciplinary/ interprofessional	X	X	X		X	X	X		X	X			X	X	X		Caregiver booklet, geriatric screening: GDS, alcohol-anamnesis	• Incidence of delirium: no effect • Mean of modified NEECHAM on day 3 for the IG[(1)] was 3.76 vs. CG[(2)]: 3.24, p=.368; • Medication: anticholinergic during hospital stay: IG[(1)]: 14% vs. CG[(2)]: 9% • Length of stay: IG[(1)] 6.0 vs. CG[(2)]: 5.8 • Functional deficits: IG[(1)]: 77% vs. CG[(2)]: 61%
5	Bo et al. (2009)	P	No routine screening; study-phase: CAM/DRS	Multidisciplinary/ interprofessional	X		X			X	X		X	X		X	X					• Incidence of delirium: IG[(1)]: 6.6% vs. CG[(2)]: 15.2% (adjusted: RR: 0.90, 95% CI 0.024-0.331, p<.001 (setting was independently associated with lower incidence, p <.001) • Length of stay: all delirious patients stayed longer (12.3 -f 3.4 vs. 6.3 + 2.0 d, p <0.001).
6	Foster et al. (2010)	P & M	Abbreviated mental test; study-phase: CAM	Multidisciplinary/ interprofessional	X	X	X	X					X							X	Clinical pathway/ standardized nursing care, "information and "rummage box", carer leaflet	• Prevalence of delirium: similar in both groups, 34 randomly selected sets of patients' notes were audited over a 4-week period. Nurses noted confusion in 14, physicians in 10 cases. Only 4 patients had an Abbreviated Mental Test. • All patients had between 1-6 prevention strategies implemented according to the care plan
7	Godfrey et al. (2013)	P		Multidisciplinary/ interprofessional	X	X	X	X	X	X	X	X	X			X	X		X	X		*Not focused on patient-outcomes*
8	Hasemann et al. (2016)	P & M	DOS; clock test, MSQ; study-phase: CAM, DRS-R-98	(Nurse-led) Multidisciplinary/ interprofessional	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Advanced screening: digit span/ clock-/ comprehension test, MMSE, individual intervention plan	• Incidence of delirium: 3,6% lower in IG[(1)], but not significantly (p=.896) • Severity of delirium: no significant effect IG[(1)]: vs. CG[(2)] (F(1,102) = 0.093; p=.761) • Duration of delirium: IG[(1)]: 4.1 days (SD 3.4) vs. CG[(2)]: 3.0 days (SD 3.1) • Adherence vs. non-adherence: (F(1.48) = 4.079, p=.050 (overall non-adherence rate: 34.1%) • Shift from neuroleptic to atypical neuroleptic less Lorazepam use (U=361.5; p=.027)
9	Holroyd-Leduc et al. (2010)	P	CAM	Multidisciplinary/ interprofessional				X	X	X		X	X	X		X		X	X		Study	• Incidence of delirium: no effect on the over-all delirium rate (33% pre vs. 31% post, p=.84), differences in enrolled hospitals • Mortality: no pre-post differences (one death among those enrolled) • Length of stay: no significant differences in 12 days post vs. 14 days pre; p=.74 • Falls: 6% post vs.10% pre; p=.43 • Discharges to long-term care: 6% post vs. 13% pre; p=.20
10	Holt et al. (2013)	P	No routine screening; study-phase: CAM/ DRS-R-98	Multidisciplinary/ interprofessional			X		X	X	X		X				X			X		• Delirium incidence during first 7 days: IG[(1)]: 4.6% vs. CG[(2)]: 13.3%, p=.006 • Duration of delirium: IG[(1)]: 0.06 days, ± 0.287 vs. CG[(2)]: 0.29 days; ± 0.931, p=.002 • Severity of delirium: IG[(1)]: 9.17, ± 7.94 vs. CG[(2)]: 16.86, ± 4.92; p=.005 • Mortality/length of hospital stay/functional status at discharge/admission to long-term care: no significant group differences • Readmission: CG[(2)] were significantly higher

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Multicomponent, non-pharmacological delirium interventions for older inpatients. A scoping review.

Supplement
No. 4

Claudia Eckstein[1], Heinrich Burkhardt[2]
1 Network Ageing Research, University of Heidelberg, Germany.
2 Department of Geriatric Medicine, University Medicine Mannheim, Germany.

No.	Study	Type of program P = Prevention M = Management	Detection	Mode of health care supply	Physical environment	Social environment	Orientation	Cognitive stimulation	Sensory impairments	Fluid balance	Nutrition/eating/metabolism	Infection	Mobilization	Medication review	(Emergency) Surgery	Pain	Day-night rhythm	Monitoring	Education	Sufficient oxygen supply	Additional interventions	Main patient outcomes
11	Jeffs et al. (2013)	P	No routine screening; study-phase: CAM/ MMSE, clock test	Multidisciplinary/ interprofessional		X	X						X									• Incidence of delirium: IG[1]: 4.9%, 95 % CI 2.3%-7.3% vs. CG[2]: 5.9% 95% CI 3.8- 9.2% • Duration of delirium: IG[1]: median: 2.4 (IQR: 0.9-8.9) vs. CG[2]: 2.1 (IQR: 1.4–6.6) days, p=0.9 • Severity of delirium: IG[1]: median 3.0 (IQR: 3.0-5.0) vs. CG[2]: 4.0 (IQR: 3.0-4.5), p=0.7 • Discharge destination/length of stay: no effect
12	Kratz et al. (2015)	P	DOS; study-phase: other several tests	Multidisciplinary/ interprofessional		X	X	X	X	X	X		X				X		X		Individual intervention plan, validation method	• Incidence of post-operative delirium: IG[1]: 4.9% (95% CI 0.0-11.5) vs. CG[2]: 20.8% (95% CI 11.3-32.1), p=.046 (pre-intervention: 20.2%) • Important predictors of post-operative delirium: low score of MMSE, advanced age, preoperative infection
13	Kurrle et al. (2019)	P & M	Cognitive screening: AMTS and further tests; delirium screening:, DRAT, CAM	Multidisciplinary/ interprofessional	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Avoiding physical restrains, CHOPs icons/magnets/ posters, advanced risk assessment, family information, education and involvement, considering anxiety, fall prevention	• Cognitive screening at admission: IG[1]: 37 vs. CG[2]: 29 (OR = 1.42, 1.04-2.72) • Cognitive screening within 24 h: IG[1]: 31 vs. CG[2]: 12 (OR = 3.32, 2.50-4.90) • DRAT completed: IG[1]: 43 vs. CG[2]: 31 (OR = 1.73, 1.28-2.33) • Delirium risk identified: IG[1]: 48 vs. CG[2]: 19 (OR = 4.04, 2.89-5.64) • Cognitive screening repeated: IG[1]: 28 vs. CG[2]: 15 (OR = 2.25, 1.56-3.25) • Delirium assessment conducted: IG[1]: 56 vs. CG[2]: 33 (OR = 2.55, 1.90-3.43) • Antipsychotics prescribed: IG[1]: 21 vs. CG[2]: 26 (OR = 1.34, 0.71-1.88) • Physical restraints used: IG[1]: 4 vs. CG[2]: 8 (OR = 0.54, 0.29-0.99) • Interaction with families: IG[1]: 64 vs. CG[2]: 39 (OR = 2.81, 2.09-3.79) • Delirium coded at discharge: IG[1]: 79 vs. CG[2]: 27 (OR = 10.2, 7.23-14.2)
14	Lundström et al. (1999)	P & M	No routine screening; study-phase: OBS-scale	Multidisciplinary/ interprofessional	X	X					X		X		X	X		X	X	X	Individual intervention plan, team collectively formulates goals with patients, 2 contact persons	*Comparison to previous studies I and II:* • Prevalence of delirium: IG[1]: 20.4% vs. CGI[2]: 33.3% (p.098), CGI[2]: 29.1% (p=.253); • Post-operative incidence: IG[1]: 30.6% vs. CGI[2]: 61.3% (p<.001), CGII[2]: 47.6% (p=.047); stay: IG[1]: 12.5 vs. CGI[2]: 17.4, CGII[2]: 11.6 days • Duration of delirium: IG[1]: 16.3% vs. CGI[2]: 39.6% (p=.004), CGII[2]: 29.1% (p=.088) • In-hospital mortality: IG[1]: 2.0% vs. CGI[2]: 2.7% (p=.805), CGII[2]: 5.8%, (p=.298) • Six-month mortality: IG[1]: 16.3% vs. CGI[2]: 16.2% (p=.986), CGII[2]: 12.6%, (p=.536) *Comparison to previous study III:* • Incidence of delirium: lower post-operative delirium (26.7% vs. 42.9%, p.129) • Better walking abilities and living conditions *Comparison to previous studies IV and V:* • Incidence of delirium: IG[1]: 21.0% vs. CGIV[2]: 52.0% (p<.001), CGV[2]: 44.0% (p=.014)
15	Lundström et al. (2005)	P & M	No routine screening; study-phase: OBS-scale, MMSE	Multidisciplinary/ interprofessional		X					X	X	X	X					X	X	Reorganisation patient allocation system with individual care, treat/assess underlying causes	• Prevalence of delirium: equally on admission and on day 7 in IG[1] (n=19/63, 30.2% vs. CG[2]: n=37/ 62, 59.7%, p=.001) • Duration of delirium: IG[1]: 10.8, ± 8.3 vs. CG[2]: 20.5, ± 17.2 days, p<.001 • No patient with dementia remained delirious on day 7 in IG[1] compared with four patients still delirious on day 7 in CG[2] • Length of stay: IG[1]: 9.4 ± 8.2 vs. CG[2]: 13.4 ± 12.3 days, p=.001); delirious patients: IG[1]: 10.8 ± 8.3 vs. CG[2]: 20.5 ± 17.2 days, p<.001 • Mortality: 2 delirious patients in IG[1] and 9 in CG[2] died during hospitalization (p=.03)
16	Lundström et al. (2007)	P & M	No routine screening; study-phase: OBS-scale, MMSE, GDS-15	Multidisciplinary/ interprofessional							X	X	X	X	X	X	X	X	X	X	Individual intervention plan, teamwork explicitly named as intervention, prevention of decubiti, osteoporosis, falls, rehabilitation, advanced mobilization	• Incidence of delirium: IG[1]: 54.9% vs. CG[2]: 75.3%, p=.003; IG[1]: 18% vs. CG[2]: 52 % were delirious after 7. Post-operative day, p<.007 • Prevalence of delirium: IG[1]: 21.8% vs. CG[2]: 30.9%, p=.144 • Duration of delirium: IG[1]: 5.0, ± 7.1 vs. CG[2]: 10.2, ± 13.3 days, p=.009 • Duration of delirium: post-operative delirium in patients with dementia was in IG[1]: 3.2 ± 4.1 vs. CG[2] 12.8 ± 17.6 days in CG[2] (p=.003) (15 patients with dementia in CG[2] were delirious on discharge, 9 from IG[1] (p<.001) • Mortality: did not differ during hospitalization and at the 4-and 12-month follow-ups between intervention and control samples • Patients from IG[1] had fewer complications, such as decubitus ulcers, urinary tract infections, nutritional complications, sleeping problems and falls than CG[2] • Length of stay: hospitalization was shorter in IG[1] than in the CG[2] (28.0 ± 17.9 days vs. 38.0 ± 40.6 days, p=.028
17	Mattison et al. (2014)	P & M	RASS, CAM	Multidisciplinary/ interprofessional	X								X	X			X	X	X		Computerized physician-order entry system, checklist to accompany standard bedside monitoring, daily review	• In-hospital mortality: Age class 70-79: IG[1]: 1.7% vs. CG[2]: 1.7%; age class ≥ 80: IG[1]: 2.5% vs. CG[2]: 2.8%; p=.39 • The number of orders to activate the rapid response team increased in participants receiving the bundle and in controls (differences OR=1.23, 95% CI 0.68-2.24, p=.49) • Participants receiving the bundle had less haloperidol (OR=0.60, 95% CI 0.39-0.91, p=.02) and less morphine (OR=0.52, 95% CI 0.42-0.63, p<.001) • Participants who received bundle were more likely to be discharged home (OR=1.18, 95% CI1.04-1.35, p=.01)

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18	Milisen et al. (2001)	P & M	NEECHAM; study-phase: CAM	Nurse-led interdisciplinary intervention program										X				X	X		Standard nursing care plan, "resource nurse for delirium"	• Incidence of delirium: IG[1]: 20.0% vs. CG[2]: 23.3%, p.82 • Duration of delirium: IG[1]: median: 1 day vs. CG[2]: median: 4 days (IQR=5.5), p=.03) • Severity of delirium: less (p=.0049) in IG[1] • Length of stay: trend toward decreased stay • Cognitive functioning: only a difference in the sub dimension "memory" in the IG[1] (p=.0357) • Functional status: no effects • Mortality: results were inconclusive
19	Miller et al. (2004)	P & M	No routine screening; study-phase: NEECHAM, Katz Index, discomfort assessment with DS-DAT	Nurse-led intervention	X	X		X	X	X			X			X	X	X	X		Elder care supportive protocol (client profile, individualized care, elder guide), observation checklist, advanced caregiver involvement	• Patient´s discomfort: The IG[1] had significantly less discomfort at T2 (mean, 6.38) than the baseline group (mean, 8.25) (independent samples t-test, r[50] = 2.70, p=.047; but after repeated measures ANOVA, these differences were no longer significant (p=.075) • Further outcome variable was described: family involvement • no significant differences between baseline and treatment conditions for the outcome variables of physical function, acute confusion, and length of stay
20	Pitkälä et al. (2006)	M	Routine: MMSE; study-phase: CAM, MMSE, digit span, proxy interview	Multidisciplinary/ interprofessional				X			X		X	X					X		Individually tailored comprehensive geriatric assessment/ treatment, detailed diagnostics of underlying causes, discharge planning	• Cognitive status: cognition, according to MMSE score had significantly improved after baseline (IG[1]:18.4 vs. CG[2]: 15.8, p=.047) • Complications during hospitalization (e.g. new fractures): IG[1]: 16.1 vs. CG[2]: 19.1 • Mortality (1-year follow-up): IG[1]: 60.0% vs. CG[2]: 64.4%, p=.638 • Permanent institutional care (1-year follow-up): IG[1]: 42.5% vs. CG[2]: 51.7%, p=.224 • Medication: IG[1] received significantly more acetylcholinesterase inhibitors (58.6% vs. 9.2%), atypical antipsychotics (69.8% vs. 30.2%), and fewer conventional neuroleptics (8.0% vs. 23.0%) than CG[2]
21	Robinson et al. (2008)	P	Retrospective chart-based method (68)	Nurse-led intervention	X	X			X				X				X		X		Caregiver information (ADL´s); portable amplifying device	• Incidence of delirium: IG[1]: 13.8% vs. CG[2]: 37.5%, p>.001 • Subgroup analyses people with dementia: 12 subjects (with various other risk factors) six of the pre-intervention group developed delirium, only 1 in the post-intervention group
22	Rudolph et al. (2014)	P	Days of the week/ months of the year backward, clock test	Nurse-led intervention			X	X									X		X		Education for patients and family members	• Length of stay: IG[1]: 4.4 days vs. CG[2]: 5.1 days • Restraint use: IG[1]: 2.8% vs. CG[2]: 6.9% • Rehabilitation discharge: IG[1]: 20.1% vs. CG[2]: 17.9% • Cost: IG[1]: 9.446 $ vs. CG[2]: 10.836 $
23	Vidán et al. (2009)	P	No routine screening; study-phase: CAM	Multidisciplinary/ interprofessional				X	X	X	X		X	X			X		X		Caregiver letter, advanced geriatric assessment	• Incidence of delirium: IG[1]: 11.7% vs. CG[2]: 18.5%, p=.04, RR 37 % (after adjustment: intervention was associated with lower incidence: OR=0.4, 95 %, CI 0.24-0.77, p=.005 • Duration of delirium: IG[1]: 31.1 ± 43.0 vs. CG[2]: 33.6 ± 22.0, p=.73 • Severity of delirium: IG[1]: 4.9 ± 0.4 vs. CG[2]: 5.3 ± 1.0, p=.08 • Length of delirium episode, hours: IG[1]: 31.1 ± 43.0 vs. CG[2]: 33.6 ± 22.0, p=.73 • Recurrence of delirium: IG[1]: 0/20 vs. CG[2]: 6/69, p=.22 • Functional decline in patients with delirium: IG[1]: 9(60.0) vs. CG[2]: 37(71.2), p=.041 • Mortality: IG[1]: n=2/20 vs. CG:[2] n=10/69, p=.60
24	Wand et al. (2014)	P & M	No routine screening; study-phase: CAM, MMSE, RUDAS, Barthel	Multi-disciplinary/ interprofessional	X			X	X	X	X	X	X	X		X	X		X	X	Avoidance of physical restraints	• Incidence of delirium: IG[1]: 10.1% vs. CG[2]: 19.0%, X^2=4.14, p=.042 • Mortality: IG[1]: 4 vs. CG[2]: 1 inpatient death, no differences in death between the groups • Functional status (on discharge): improved in IG[1] (mean improvement 5.3 points, p<.001, SD 13.31, 95% CI -7.61 to -2.97, not seen in the CG[2]
25	Wanich et al. (1992)	P & M	No routine screening; study-phase: MMSE, BPRS, Katz Index	Nurse-led intervention	X	X	X						X	X					X		Caregiver education, discharge planning	• Incidence of delirium: IG[1]: 19% vs. CG[2]: 22%, p=.61 • Functional status: (1) better: IG[1]: 21% vs. CG[2]: 10%; same: IG[1]: 69% vs. CG[2]: 74%; • Worse: IG[1]: 13% vs. CG[2]: 16% • Complication during hospitalization: IG[1]: 19% vs. CG[2]: 16%, p=.62 • Mortality: IG[1]: 8% vs. CG[2]: 5%, p=.36 • Length of stay/admission to long-term care/ number of complications: no significant difference in both groups

Legend of above table:

(1)   IG   Intervention Group
(2)   CG   Controll Group;
X   Intervention component integrated or as a risk factor considered