**Efficacy of interventions to reduce coercive treatment in mental health services:**

**umbrella review of randomised evidence**

Barbui and colleagues.

**SUPPLEMENT**

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**Umbrella review search strategy**

**Pubmed search:**

(coercio\*[Title/Abstract] OR involunt\*[Title/Abstract] OR restraint\*[Title/Abstract] OR seclusion\*[Title/Abstract] OR compulsory\*[Title/Abstract]) AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

**Cochrane library search:**

coerci\* OR involunta\* OR restraint OR seclusion OR compul\*

**CINAHL seach:**

(MH "Systematic Review" OR MH "Meta Analysis") AND (MH coercion OR MH involuntary OR MH restraint OR MH seclusion OR MH compulsory OR TX coerci\* OR TX involunta\* OR TX restraint\* OR TX seclus\* OR TX compulsory)

**Medline (OvidSP) search:**

(coerci\* or involunta\* or restraint\* or seclusion\* or compulso\*).ab,ti. AND (meta-analysis or systematic review).pt.

**PsychARTICLES:**

(TX "Meta Analysis") AND (TX coerci\* OR TX involunta\* OR TX restraint\* OR TX seclusion\* OR TX compulso\*)

**Campbell Collaboration search:**

https://campbellcollaboration.org/component/jak2filter/?Itemid=1352&issearch=1&isc=1&category\_id=101&ordering=publishUp

coercion | involuntary | restraint | seclusion | compulsory

**Epistemonikos search:**

https://www.epistemonikos.org/en/advanced\_search

(title:(coerci\* OR involunta\* OR restraint\* OR seclusion\* OR compulso\*) OR abstract:(coerci\* OR involunta\* OR restraint\* OR seclusion\* OR compulso\*)) AND (meta-analysis OR systematic review)

**Pubmed search using terms for individual interventions:**

Peer support:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "peer group"[MeSH Terms] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Circle of support:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND ("circle"[All Fields] OR "circles"[All Fields]) AND "support"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Circle of care:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND ("circle"[All Fields] OR "circles"[All Fields]) AND "care"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Open dialogue:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "Open"[All Fields] AND "dialogue"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Crisis plan:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "Crisis"[All Fields] AND "plan"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Crisis card:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "Crisis"[All Fields] AND "card"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Advance statement:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "Advance"[All Fields] AND ("statement"[All Fields] OR "directive"[All Fields]) AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Community treatment order:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND ("community"[All Fields] AND (((((("therapeutics"[MeSH Terms] OR "therapeutics"[All Fields]) OR "treatments"[All Fields]) OR "therapy"[MeSH Subheading]) OR "therapy"[All Fields]) OR "treatment"[All Fields]) OR "treatment's"[All Fields])) AND "order"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Compliance enhancement:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND ((((("compliances"[All Fields] OR "patient compliance"[MeSH Terms]) OR ("patient"[All Fields] AND "compliance"[All Fields])) OR "patient compliance"[All Fields]) OR "compliance"[All Fields]) OR "compliance"[MeSH Terms]) AND (((((((("enhance"[All Fields] OR "enhanced"[All Fields]) OR "enhancement"[All Fields]) OR "enhancements"[All Fields]) OR "enhancer"[All Fields]) OR "enhancer's"[All Fields]) OR "enhancers"[All Fields]) OR "enhances"[All Fields]) OR "enhancing"[All Fields]) AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

Integrated treatment:

("mental disorders"[MeSH Terms] OR "mental health"[MeSH Terms]) AND "Integrated"[All Fields] AND "treatment"[All Fields] AND (meta-analysis[Publication Type] OR meta-analysis[Title/Abstract] OR meta-analysis[MeSH Terms] OR systematic[Title/Abstract] OR review[Title/Abstract])

**References of the 10 systematic reviews identified by the search strategy**

|  |
| --- |
| Reference |
| Ayalon L, Lev S, Green O, Nevo U. A systematic review and meta-analysis of interventions designed to prevent or stop elder maltreatment. Age Ageing 2016; 45(2): 216-227. |
| Campbell LA, Kisely SR. Advance treatment directives for people with severe mental illness. Cochrane Library 2009, Issue 1. Art. No.: CD005963. |
| Dahm KT, Leiknes KA, Husum TL, Kirkehei I, Hofmann B, Myhrhaug HT et al. Interventions for Reducing Seclusion and Restraint in Mental Health for Adults. 2012. Accessed [16-March-2020] at: <https://www.ncbi.nlm.nih.gov/books/NBK482109/pdf/Bookshelf_NBK482109.pdf> |
| de Jong MH, Kamperman AM, Oorschot M, Priebe S, Bramer W, van dS et al. Interventions to Reduce Compulsory Psychiatric Admissions: A Systematic Review and Meta-analysis. JAMA Psychiatry 2016; 73(7): 657-664. |
| Farrelly S, Brown GE, Flach C, Barley E, Laugharne R, Henderson C. User-held personalised information for routine care of people with severe mental illness. Cochrane Database of Systematic Reviews 2013, Issue 10. Art. No.: CD001711. |
| Kisely S, Hall K. An updated meta-analysis of randomized controlled evidence for the effectiveness of community treatment orders. Canadian Journal of Psychiatry 2014; 59(10): 561-564. |
| Kisely SR, Campbell LA, O'Reilly R. Compulsory community and involuntary outpatient treatment for people with severe mental disorders. Cochrane Database of Systematic Reviews 2017, Issue 3. Art. No.: CD004408. |
| Lan SH, Lu LC, Lan SJ, Chen JC, Wu WJ, Chang SP et al. Educational intervention on physical restraint use in long-term care facilities - Systematic review and meta-analysis. Kaohsiung Journal of Medical Sciences 2017; 33(8): 411-421. |
| Molyneaux E, Turner A, C, y B, L, au S et al. Crisis-planning interventions for people with psychotic illness or bipolar disorder: systematic review and meta-analyses. BJPsych Open 2019; 5(4): e53. |
| Stovell D, Morrison AP, Panayiotou M, Hutton P. Shared treatment decision-making and empowerment-related outcomes in psychosis: systematic review and meta-analysis. British Journal of Psychiatry 2016; 209(1): 23-28. |

**PICO table of the 10 systematic reviews identified by the search strategy, and selection process of five meta-analyses reported by three systematic reviews**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Population | Intervention | Outcome | Reference | Included | Reason |
| People with severe mental illness | Shared decision making (advance statements, crisis cards, user-held information) | Number of patients readmitted involuntarily | Campbell 2012 | NO | Search: Feb 2008; two studies included |
| Dahm 2017 | NO | Search: Mar 2017; three studies included |
| de Jong 2016 | NO | Search: Apr 2015; four studies included |
| Farrelly 2013 | NO | Search: Aug 2011; three studies included |
| Molyneaux 2019 | YES | Search: Oct 2018; five studies included: SR with the largest number of component studies |
| Stovell 2016 | NO | Search: Aug 2013; three studies included |
| People with severe mental illness | Community Treatment Orders | Number of patients readmitted involuntarily | de Jong 2016 | YES | Search: Apr 2015; three studies included |
| Kysely 2014 | NO | Search: Nov 2013; three studies included |
| Kysely 2017 | NO | Search: Jun 2016; two studies included |
| People with severe mental illness | Adherence enhancement | Number of patients readmitted involuntarily | de Jong 2016 | YES | Search: Apr 2015; two studies included |
| People with severe mental illness | Integrated treatment | Number of patients readmitted involuntarily | de Jong 2016 | YES | Search: Apr 2015; four studies included |
| People in long-term care institutions or nursing homes | Staff training (educational interventions) | Restraint use | Ayalon 2016 | NO | Nine studies included in meta-analysis |
| Lan 2017 | YES | Search: Jan 2017; eleven studies included in meta-analysis: SR with the largest number of component studies |

**List of excluded studies with reason**

|  |  |
| --- | --- |
| Reference |  |
| Acri M, Hooley CD, Richardson N, Moaba LB. Peer Models in Mental Health for Caregivers and Families. Community Ment Health Journal 2016; 53(2): 241-249. | Wrong PICO |
| Allen DE, Fetzer S, Siefken C, Nadler-Moodie M, Goodman K. Decreasing Physical Restraint in Acute Inpatient Psychiatric Hospitals: A Systematic Review. Journal of the American Psychiatric  Nurses Association 2018; 25(5): 1078390318817130. | Wrong design (no meta-analysis) |
| Alvarez-Jimenez M, Alcazar-Corcoles MA, Gonzalez-Blanch C, Bendall S, McGorry PD, Gleeson JF. Online, social media and mobile technologies for psychosis treatment: a systematic review on novel user-led interventions. Schizophrenia Research 2014; 156(1): 96-106. | Wrong PICO |
| Anderson K, Bird M, MacPherson S, Blair A. How do staff influence the quality of long-term dementia care and the lives of residents? A systematic review of the evidence. International Psychogeriatrics 2016; 28(8): 1263-1281. | Wrong PICO |
| Andrews J, Falkmer M, Girdler S. Community participation interventions for children and adolescents with a neurodevelopmental intellectual disability: a systematic review. Disability and Rehabilitation 2015; 37(10): 825-833. | Wrong PICO |
| Annamalai J, Gan Thiam S, Xie H. Effectiveness of non-pharmacological interventions to reduce the use of physical restraint in mental health settings: a systematic review protocol. JBI Database of Systematic Reviews & Implementation 2014; 12(6): 24-35. | Wrong design (no meta-analysis) |
| Bak J, Br, Christensen M, Sestoft DM, Zoffmann V. Mechanical restraint--which interventions prevent episodes of mechanical restraint?- a systematic review. Perspect Psychiatr Care 2011; 48(2): 83-94. | Wrong design (no meta-analysis) |
| Barnett P, Matthews H, Lloyd-Evans B, Mackay E, Pilling S, Johnson S. Compulsory community treatment to reduce readmission to hospital and increase engagement with community care in people with mental illness: a systematic review and meta-analysis. Lancet Psychiatry 5(12): 1013-1022. | Wrong design (non-randomised trials included) |
| Battin C, Bouvet C, Hatala C. A systematic review of the effectiveness of the clubhouse model. Psychiatric Rehabilitation Journal 2016; 39(4): 305-312. | Wrong PICO |
| Bird M, Anderson K, MacPherson S, Blair A. Do interventions with staff in long-term residential facilities improve quality of care or quality for life people with dementia? A systematic review of the evidence. International Psychogeriatrics 2016; 28(12): 1-27. | Wrong design (no meta-analysis on restraint use) |
| Bone JK, McCloud T, Scott HR, Machin K, Markham S, Persaud K et al. Psychosocial Interventions to Reduce Compulsory Psychiatric Admissions: A Rapid Evidence Synthesis. EClinicalMedicine 2019; 10: 58-67. | Wrong design (no meta-analysis) |
| Briones-Peralta MA, Rodrìguez-Martìn B. [Effectiveness of training interventions aimed at reducing physical restraints in institutionalised older people: A systematic review]. 2016; 52(2): 93-101. | Wrong design (no meta-analysis) |
| Cabassa LJ, Camacho D, Velez-Grau CM, Stefancic A. Peer-based health interventions for people with serious mental illness: A systematic literature review. Journal of Psychiatric Research 2017; 84: 80-89. | Wrong design (no meta-analysis) |
| Canadian Agency for Drug and Technologies in Health. Removal of physical restraints in long term care settings: clinical safety and harm. 2014. Accessed [16-March-2020] at: <https://www.cadth.ca/removal-physical-restraints-long-term-care-settings-clinical-safety-and-harm> | Wrong PICO |
| Chien WT, Clifton AV, Zhao S, Lui S. Peer support for people with schizophrenia or other serious mental illness. Cochrane Database of Systematic Reviews 2019, Issue 4. Art. No.: CD010880. | Wrong PICO |
| Chinman M, George P, Dougherty RH, Daniels AS, Ghose SS, Swift A et al. Peer support services for individuals with serious mental illnesses: assessing the evidence. Psychiatric Services 2014; 65(4): 429-441. | Wrong PICO |
| Choi KR, Omery AK, Watkins AM. An Integrative Literature Review of Psychiatric Rapid Response Teams and Their Implementation for De-escalating Behavioral Crises in Nonpsychiatric Hospital Settings. Journal of Nursing Administration 2019; 49(6): 297-302. | Wrong PICO |
| Cordier R, Vilaysack B, Doma K, Wilkes-Gillan S, Speyer R. Peer Inclusion in Interventions for Children with ADHD: A Systematic Review and Meta-Analysis. BioMed Research International 2018; 2018: 7693479. | Wrong PICO |
| De Bellis A, Mosel K, Curren D, Prendergast J, Harrington A, Muir-Cochrane E. Education on physical restraint reduction in dementia care: a review of the literature. Dementia 2011; 12(1): 93-110. | Wrong design (no meta-analysis) |
| Donald F, Martin-Misener R, Carter N, Donald EE, Kaasalainen S, Wickson-Griffiths A et al. A systematic review of the effectiveness of advanced practice nurses in long-term care. Journal of Advanced Nursing 2013; 69(10): 2148-2161. | Wrong design (no meta-analysis) |
| Du M, Wang X, Yin S, Shu W, Hao R, Zhao S et al. De-escalation techniques for psychosis-induced aggression or agitation. Cochrane Database of Systematic Reviews 2017, Issue 4. Art. No.: CD009922 | Wrong design (no meta-analysis) |
| Fuhr DC, Salisbury TT, De Silva MJ, Atif N, van Ginneken N, Rahman A et al. Effectiveness of peer-delivered interventions for severe mental illness and depression on clinical and psychosocial outcomes: a systematic review and meta-analysis. Social Psychiatry and Psychiatric Epidemiology 2014; 49(11): 1691-1702. | Wrong PICO |
| Garcia-Perez L, Serrano-Aguilar P. Cost-effectiveness of interventions to enhance medication adherence in psychiatric patients: a systematic review. Current Clinical Pharmacology 2011; 6(2): 115-124. | Wrong PICO |
| Gaskin CJ, McVilly KR, McGillivray JA. Initiatives to reduce the use of seclusion and restraints on people with developmental disabilities: a systematic review and quantitative synthesis. Research in Developmental Disabilities 2013; 34(11): 3946-3961. | Wrong design (non-randomised trials included) |
| Gaynes BN, Brown C, Lux LJ, Brownley K, Van Dorn R, Edlund M et al. Strategies To De-escalate Aggressive Behavior in Psychiatric Patients. Comparative Effectiveness Review 2016. AHRQ Publication No. 16-EHC032-EF. Accessed [16-March-2020] at: <https://www.ncbi.nlm.nih.gov/books/NBK379399/pdf/Bookshelf_NBK379399.pdf> | Wrong design (no meta-analysis) |
| Gaynes BN, Brown CL, Lux LJ, Brownley KA, Van Dorn RA, Edlund MJ et al. Preventing and De-escalating Aggressive Behavior Among Adult Psychiatric Patients: A Systematic Review of the Evidence. Psychiatric Services 2017; 68(8): 819–831 | Wrong design (no meta-analysis) |
| Giacco D, Conneely M, Masoud T, Burn E, Priebe S. Interventions for involuntary psychiatric inpatients: A systematic review. European Psychiatry 2018; 54: 41-50. | Wrong design (no meta-analysis) |
| Gomis O, Palma C, Farriols N. Domiciliary intervention in psychosis: a systematic review. Actas Españolas de Psiquiatría 2017;45(6): 290-302. | Wrong design (no meta-analysis) |
| Gooding P, McSherry B, Roper C. Preventing and Reducing "Coercion" in Mental Health Services: An International Scoping Review of English-Language Studies. Acta Psychiatrica Scandinavica 2020: 1–13 | Wrong design (no meta-analysis) |
| Goulet MH, Larue C. Post-Seclusion and/or Restraint Review in Psychiatry: A Scoping Review. Archives of Psychiatric Nursing 2016; 30(1): 120-128. | Wrong PICO |
| Goulet MHln, Larue C, Dumais A, re. Evaluation of seclusion and restraint reduction programs in mental health: A systematic review. Aggression and Violent Behavior 2017; 34: 139-146. | Wrong design (no meta-analysis) |
| Gray R, Bressington D, Ivanecka A, Hardy S, Jones M, Schulz M et al. Is adherence therapy an effective adjunct treatment for patients with schizophrenia spectrum disorders? A systematic review and meta-analysis. BMC Psychiatry 2016; 16:90. | Wrong PICO |
| Hammervold UE, Norvoll R, Aas RW, Sagvaag H. Post-incident review after restraint in mental health care -a potential for knowledge development, recovery promotion and restraint prevention. A scoping review. BMC Health Services Research 2019; 19(1): 235. | Wrong PICO |
| Henderson C, LaugharneR. User-held personalised information for routine care of people with severe mental illness. Cochrane Database of Systematic Reviews 1999, Issue 3. Art. No.: CD001711 | Wrong PICO |
| Hirsch S, Steinert T. Measures to Avoid Coercion in Psychiatry and Their Efficacy. Deutsches Ärzteblatt International 2019; 116(19): 336-343. | Wrong design (no meta-analysis) |
| Hubbeling D, Bertram R. Crisis resolution teams in the UK and elsewhere. Journal of Mental Health 2012; 21(3): 285-295. | Wrong design (no meta-analysis) |
| Johnson ME. Violence and restraint reduction efforts on inpatient psychiatric units. Issues in Mental Health Nursing 2010; 31(3): 181-197. | Wrong design (no meta-analysis) |
| Kantorski LP, Cardano M. [Open Dialogue and the Challenges for its Implementation - an analysis based on a review of the literature]. Ciência & Saúde Coletiva 2019; 24(1): 229-246. | Wrong PICO |
| Kersting XAK, Hirsch S, Steinert T. Physical harm and death in the context of coercive measures in psychiatric patients: A systematic review. Frontiers in Psychiatry 2019; 10. | Wrong PICO |
| Kisely S. Randomised controlled evidence for the effect of community treatment orders on social outcomes and coercion: An update of a cochrane systematic review. Australian & New Zealand Journal of Psychiatry 2015; 49(S1): 61. | Wrong PICO |
| Kisely S. Canadian studies on the effectiveness of community treatment orders. Canadian Journal of Psychiatry 2016; 61(1): 7-14. | Wrong design (no meta-analysis) |
| Knox DK, Holloman GH, Jr. Use and avoidance of seclusion and restraint: consensus statement of the american association for emergency psychiatry project Beta seclusion and restraint workgroup. Western Journal of Emergency Medicine 2012; 13(1): 35-40. | Wrong design (no meta-analysis) |
| Kynoch K, Wu CJ, Chang AM. Interventions for Preventing and Managing Aggressive Patients Admitted to an Acute Hospital Setting: A Systematic Review. Worldviews on Evidence-Based Nursing 2011; 8(2): 76-86. | Wrong PICO |
| Lloyd-Evans B, Mayo-Wilson E, Harrison B, Istead H, Brown E, Pilling S et al. A systematic review and meta-analysis of randomised controlled trials of peer support for people with severe mental illness. BMC Psychiatry 2014; 14:39. | Wrong PICO |
| Maitre E, Debien C, Nicaise P, Wyngaerden F, Le Galudec M, Genest P et al. [Advanced directives in psychiatry: A review of the qualitative literature, a state-of-the-art and viewpoints]. L’Encéphale 2013; 39(4): 244-251. | Wrong PICO |
| Malivert M, Fatseas M, Denis C, Langlois E, Auriacombe M. Effectiveness of therapeutic communities: a systematic review. European Addiction Research 2012; 18(1): 1-11. | Wrong PICO |
| Maughan D, Molodynski A, Rugkasa J, Burns T. A systematic review of the effect of community treatment orders on service use. Social Psychiatry Psychiatric Epidemiology 2014; 49(4): 651-663. | Wrong design (no meta-analysis) |
| Mohler R, Meyer G. Development methods of guidelines and documents with recommendations on physical restraint reduction in nursing homes: a systematic review. BMC Geriatrics 2005; 15: 152. | Wrong PICO |
| Mohler R, Richter T, Kopke S, Meyer G. Interventions for preventing and reducing the use of physical restraints in long-term geriatric care - a Cochrane review. Cochrane Database of Systematic Reviews 2012; 21(21): 3070-3081. | Wrong design (no meta-analysis) |
| Newton-Howes G, Mullen R. Coercion in psychiatric care: systematic review of correlates and themes. Psychiatric Services 2011; 62(5): 465-470. | Wrong PICO |
| Nicaise P, Lorant V, Dubois V. Psychiatric Advance Directives as a complex and multistage intervention: a realist systematic review. Health and Social Care in the Community 2012; 21(1): 1-14. | Wrong design (no meta-analysis) |
| Norwegian Knowledge Centre for the Health Services. Coercive treatment of persons dependent on opioids. 2010. Accessed [16-March-2020] at: <https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2009-og-eldre/rapport_0916_tvangsbehandliing_opioidavhengige2.pdf> | Wrong PICO |
| Rainier NC. Reducing physical restraint use in alcohol withdrawal patients: a literature review. Dimensions of Critical Care Nursing 2014; 33(4): 201-206. | Wrong design (no meta-analysis) |
| Repper J, Carter T. A review of the literature on peer support in mental health services. Journal of Mental Health 2011; 20(4): 392-411. | Wrong design (no meta-analysis) |
| Roy C, Castonguay A, Fortin M, Drolet C, Franche-Choquette G, Dumais A et al. The Use of Restraint and Seclusion in Residential Treatment Care for Youth: A Systematic Review of Related Factors and Interventions. Trauma, Violence, & Abuse 2019; 1524838019843196. | Wrong design (no meta-analysis) |
| Rugkasa J, Dawson J, Burns T. CTOs: what is the state of the evidence? Social Psychiatry and Psychiatric Epidemiology 2014; 49(12): 1861-1871. | Wrong design (no meta-analysis) |
| Sashidharan SP, Mezzina R, Puras D. Reducing coercion in mental healthcare. Epidemiology and Psychiatric Sciences 2019; 28(6): 1-8. | Wrong design (no meta-analysis) |
| Scanlan JN. Interventions to reduce the use of seclusion and restraint in inpatient psychiatric settings: what we know so far a review of the literature. International Journal of Social Psychiatry 2010; 56(4): 412-423. | Wrong design (no meta-analysis) |
| Stewart D, Van der Merwe M, Bowers L, Simpson A, Jones J. A review of interventions to reduce mechanical restraint and seclusion among adult psychiatric inpatients. Issues in Mental Health Nursing 2010; 31(6): 413-424. | Wrong design (no meta-analysis) |
| Sugiura K, Mahomed F, Saxena S, Patel V. An end to coercion: rights and decision-making in mental health care. Bulletin of the World Health Organization 2020; 98: 52–58 | Wrong design (no meta-analysis) |
| Tolli S, Partanen P, Kontio R, H+ñggmanGÇÉLaitila A. A quantitative systematic review of the effects of training interventions on enhancing the competence of nursing staff in managing challenging patient behaviour. Journal of Avanced Nursing 2017; 73(12): 2817-2831. | Wrong design (no meta-analysis) |
| Vakiparta L, Suominen T, Paavilainen E, Kylma J. Using interventions to reduce seclusion and mechanical restraint use in adult psychiatric units: an integrative review. Scandinavian Journal of Caring Sciences 2019; 33(4): 765-778. | Wrong design (no meta-analysis) |
| Valenkamp M, Delaney K, Verheij F. Reducing seclusion and restraint during child and adolescent inpatient treatment: still an underdeveloped area of research. Journal of Child and Adolescent Psychiatric Nursing 2014; 27(4): 169-174. | Wrong design (no meta-analysis) |
| Wheeler C, Lloyd-Evans B, Churchard A, Fitzgerald C, Fullarton K, Mosse L et al. Implementation of the Crisis Resolution Team model in adult mental health settings: a systematic review. BMC Psychiatry 2015; 15:74. | Wrong PICO |
| Widmayer S, Borgwardt S, Lang UE, Huber CG. Could Animal-Assisted Therapy Help to Reduce Coercive Treatment in Psychiatry? Frontiers in Psychiatry 2019; 10: 794. | Wrong PICO |
| Williams DE. Reducing and eliminating restraint of people with developmental disabilities and severe behavior disorders: an overview of recent research. Research in Developmental Disabilities 2010; 31(6): 1142-1148. | Wrong design (no meta-analysis) |
| Ye J, Xiao A, Yu L, Guo J, Lei H, Wei H et al. Staff Training Reduces the Use of Physical Restraint in Mental Health Service, Evidence-based Reflection for China. Archives of Psychiatric Nursing 2018; 32(3): 488-494. | Wrong design (non-randomised trials included) |

**Strength of association classes according to umbrella review criteria**

|  |  |
| --- | --- |
| Strength of association | Criteria |
| Convincing (Class I) | * More than 1000 participants * Significant summary associations (p<10-6) per random-effects calculations * No evidence of small-study effects * No evidence of excess of significance bias * Prediction intervals not including the null value * Largest study nominally significant (p<0.05) * Not large heterogeneity (i.e., *I2*< 50%) |
| Highly Suggestive (Class II) | * More than 1000 participants * Significant summary associations (p<10-6) per random-effects calculation * Largest study nominally significant (p<0.05) |
| Suggestive (Class III) | * More than 1000 participants * Significant summary associations (p<10-3) per random-effects calculations |
| Weak (Class IV) | * Significant summary associations (p < 0.05) per random-effects calculations |
| Non-significant | * Non-significant summary associations (p >0.05) |

**Quality assessment: AMSTAR-2 of the ten systematic reviews identified by the search strategy**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Meta-analysis | AMSTAR-2 Domain | | | | | | | | | | | | | | | |
| 1 | 2\* | 3 | 4\* | 5 | 6 | 7\* | 8 | 9\* | 10 | 11\* | 12 | 13\* | 14 | 15\* | 16 |
| Ayalon 2016 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Campbell 2012 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Dahm 2017 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **de Jong 2016** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Farrelly 2013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Kisely 2014 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Kisely 2017 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Lan 2017** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Molyneaux 2019** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stovell 2016 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\* critical domains; studies in bold included in review

|  |  |
| --- | --- |
|  | Criterion met |
|  | Criterion not met |
|  | Criterion partially met |

AMSTAR 2 domains: 1 PICO, 2 protocol, 3 study design, 4 search strategy, 5 study selection, 6 data extraction, 7 excluded studies, 8 included studies, 9 risk of bias, 10 funding sources, 11 meta-analysis, 12 impact risk of bias, 13 discussing risk of bias, 14 heterogeneity, 15 publication bias, 16 conflicts of interest.

**Tabular descriptions of umbrella review criteria by meta-analysis**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Intervention | More than 1000 participants | Significant summary associations (p < 0.05) | Significant summary associations (p<0.001) | Significant summary associations (p<10-6) | Not large heterogeneity (i.e., I2< 50%) | Prediction intervals not including the null value | Largest study nominally significant (p<0.05) | No evidence of small-study effects | No evidence of excess of significance bias | Strength of association |
| Shared decision-making |  |  |  |  |  |  |  |  |  | WEAK |
| Community treatment orders |  |  |  |  |  |  |  |  |  | NO ASSOCIATION |
| Adherence therapy |  |  |  |  |  |  |  |  |  | NO ASSOCIATION |
| Integrated care |  |  |  |  |  |  |  |  |  | WEAK |
| Staff training |  |  |  |  |  |  |  |  |  | SUGGESTIVE |

|  |  |
| --- | --- |
|  | Criterion met |
|  | Criterion not met |

**GRADE summary of findings table**

| Intervention - Outcomes | **Anticipated absolute effects** (95% CI) | | Relative effect (95% CI) | № of participants  (studies) | Certainty of the evidence (GRADE) |
| --- | --- | --- | --- | --- | --- |
| **Risk with [comparison]** | **Risk with**  **[intervention]** |
| Shared decision-making - involuntary admissions | 225 per 1.000 | **169 per 1.000** (135 to 207) | **RR 0.75** (0.60 to 0.92) | 1433 (6 RCTs) | ⨁⨁⨁◯ MODERATE a |
| Community treatment orders - involuntary admissions | 454 per 1.000 | **431 per 1.000** (368 to 499) | **RR 0.95** (0.81 to 1.10) | 742 (3 RCTs) | ⨁⨁◯◯ LOW a,b |
| Adherence therapy - involuntary admissions | 169 per 1.000 | **88 per 1.000** (20 to 388) | **RR 0.52** (0.12 to 2.29) | 250 (2 RCTs) | ⨁◯◯◯ VERY LOW a,c,d |
| Integrated care - involuntary admissions | 303 per 1.000 | **200 per 1.000** (140 to 288) | **RR 0.60** (0.45 to 0.81) | 310 (2 RCTs) | ⨁⨁◯◯ LOW a,e |
| Staff training - restraint use | 357 per 1.000 | **264 per 1.000** (221 to 311) | **RR 0.74** (0.62 to 0.87) | 5819 (11 RCTs) | ⨁⨁⨁◯ MODERATE f |

#### Explanations

a. None of the trials were able to mask the participants or staff, because of the nature of the intervention, so performance bias cannot be excluded. Detection bias is unlikely as the primary outcome (involuntary admissions) was assessed or cross-checked with hospital records.

b. Only three studies with less than 1000 participants overall

c. I-squared is 53%

d. Confidence interval ranges from appreciable benefit to appreciable harm

e. Less than 1000 participants overall, and relatively low number of events.

f. I-squared is 80%

**Molyneaux 2018: Shared decision-making interventions**



Random-effect p-value = .0065333346470068

Egger's test for small-study effects:

Regress standard normal deviate of intervention

effect estimate against its standard error

Number of studies = 6 Root MSE = 1.029

------------------------------------------------------------------------------

Std\_Eff | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

slope | .763329 .2378185 3.21 0.033 .1030389 1.423619

bias | -.3680008 1.21265 -0.30 0.777 -3.734857 2.998855

------------------------------------------------------------------------------

Test of H0: no small-study effects P = 0.777

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----------------------------------------------------------------------+

| M-A N Expected Observed pChi pBin pBin, more pBin, less |

|-----------------------------------------------------------------------|

| 1 6 2.51 4 0.22 0.24 0.20 0.95 |

+-----------------------------------------------------------------------+

|  |
| --- |
| **Differences between Molyneaux 2018 meta-analysis and the present re-analysis**  One study (Lester 2003) was added to the analysis as it was included in the Farrelly 2013 systematic review on shared decision-making interventions, but not in Molyneaux 2018. |

**de Jong 2016: Community treatment orders**



Random-effect p-value = .5127069883253332

Egger's test for small-study effects:

Regress standard normal deviate of intervention

effect estimate against its standard error

Number of studies = 3 Root MSE = .3869

------------------------------------------------------------------------------

Std\_Eff | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

slope | .6470152 .3153671 2.05 0.289 -3.360104 4.654134

bias | 2.354053 2.455926 0.96 0.513 -28.85144 33.55955

------------------------------------------------------------------------------

Test of H0: no small-study effects P = 0.513

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----------------------------------------------------------------------+

| M-A N Expected Observed pChi pBin pBin, more pBin, less |

|-----------------------------------------------------------------------|

| 1 3 0.18 0 0.66 1.00 1.00 0.83 |

+-----------------------------------------------------------------------+

|  |
| --- |
| **Differences between Jong 2016 (community treatment orders) meta-analysis and the present re-analysis**  None. |

**de Jong 2016: Adherence therapy**



Random-effect p-value = 0,397933718876185

Egger's test for small-study effects:

Regress standard normal deviate of intervention

effect estimate against its standard error

Number of studies = 2 Root MSE = 0

------------------------------------------------------------------------------

Std\_Eff | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

slope | 6.870004 . . . . .

bias | -19.60001 . . . . .

------------------------------------------------------------------------------

Test of H0: no small-study effects P = .

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----------------------------------------------------------------------+

| M-A N Expected Observed pChi pBin pBin, more pBin, less |

|-----------------------------------------------------------------------|

| 1 2 1.07 1 0.92 1.00 0.78 0.71 |

+-----------------------------------------------------------------------+

|  |
| --- |
| **Differences between Jong 2016 (adherence therapy) meta-analysis and the present re-analysis**  None. |

**de Jong 2016: Integrated care**



Random-effect p-value = . 0257392755750998

Egger's test for small-study effects:

Regress standard normal deviate of intervention

effect estimate against its standard error

Number of studies = 2 Root MSE = 0

------------------------------------------------------------------------------

Std\_Eff | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

slope | 1.37 . . . . .

bias | -3.919999 . . . . .

------------------------------------------------------------------------------

Test of H0: no small-study effects P = .

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----------------------------------------------------------------------+

| M-A N Expected Observed pChi pBin pBin, more pBin, less |

|-----------------------------------------------------------------------|

| 1 2 0.53 2 0.02 0.07 0.07 1.00 |

+-----------------------------------------------------------------------+

|  |
| --- |
| **Differences between Jong 2016 (integrated care) meta-analysis and the present re-analysis**  One study (Ohlenschlaeger et al., 2008) was removed from the analysis as it did not actually report the rate of involuntary admissions;  One study (Lay et al., 2015) was removed from the analysis as the same study (with a different publication reporting follow-up data, Lay et al., 2018) was included in the analysis of shared-decision making interventions. |

**Lan 2017: Staff training**



Random-effect p-value = .0002841915404285

Egger's test for small-study effects:

Regress standard normal deviate of intervention

effect estimate against its standard error

Number of studies = 11 Root MSE = 2.799

------------------------------------------------------------------------------

Std\_Eff | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

slope | .8302111 .1128576 7.36 0.000 .5749094 1.085513

bias | -1.006729 1.509386 -0.67 0.522 -4.421197 2.40774

------------------------------------------------------------------------------

Test of H0: no small-study effects P = 0.522

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+------------------------------------------------------------------------+

| M-A N Expected Observed pChi pBin pBin, more pBin, less |

|------------------------------------------------------------------------|

| 1 11 5.30 8 0.10 0.13 0.09 0.98 |

+------------------------------------------------------------------------+

|  |
| --- |
| **Differences between Lan 2017 (staff training) meta-analysis and the present re-analysis**  The study conducted by Evans et al., 1997 included two active staff training interventions in comparison with an inactive control condition. We therefore halved numerator and denominator of the control group in order not to count twice participants with and without the event of interest. |

**PRISMA checklist**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section/topic** | **#** | **Checklist item** | **Reported on page #** |
| **TITLE** | | |  |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | 1 |
| **ABSTRACT** | | |  |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 2 |
| **INTRODUCTION** | | |  |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | 4 |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | 5 |
| **METHODS** | | |  |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | 6 |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | 6-7 |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | 6-7 |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | Appendix |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | 6-7 |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | 7 |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | 7 |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | 7-8 |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | 8 |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis. | 8-9 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Section/topic** | **#** | **Checklist item** | **Reported on page #** |
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | 9 |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | 9 |
| **RESULTS** | | |  |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | 10 and apendix |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | 10 and Table 1 |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | 11 and appendix |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | 11-12, Figure 2 and appendix |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | 11-12, Figure 2 and appendix |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | 12 and appendix |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | 12 |
| **DISCUSSION** | | |  |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | 13-14 |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 16-17 |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 14-15 |
| **FUNDING** | | |  |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | 3 |

*From:*  Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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