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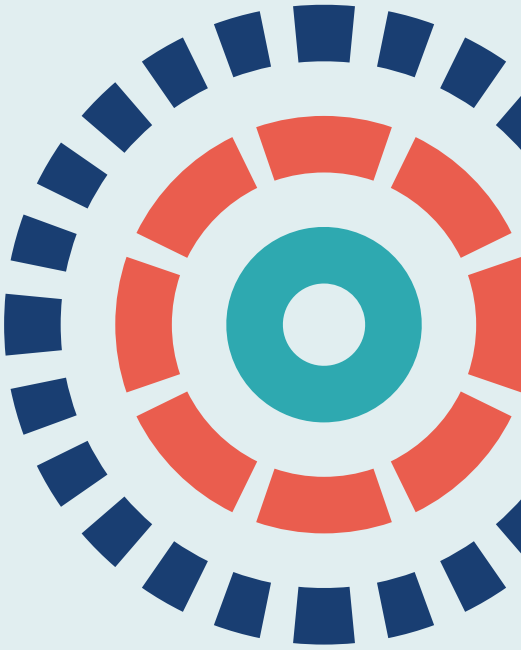

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John Baker,[1*] Kathryn Berzins,[1] Krysia Canvin,[1] Iris Benson,[2] Ian Kellar,[3] Judy Wright,[4] Rocio Rodriguez Lopez,[4] Joy Duxbury,[5] Tim Kendall[6] and Duncan Stewart[7]

[1]School of Healthcare, University of Leeds, Leeds, UK
[2]Mersey Care NHS Foundation Trust, Prescot, UK
[3]School of Psychology, University of Leeds, Leeds, UK
[4]Leeds Institute of Health Sciences, University of Leeds, Leeds, UK
[5]Faculty of Health, Psychology and Social Care, Manchester Metropolitan University, Manchester, UK
[6]NHS England, Redditch, UK
[7]Department of Health Sciences, University of York, York, UK

*Corresponding author

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Abstract

Non-pharmacological interventions to reduce restrictive practices in adult mental health inpatient settings: the COMPARE systematic mapping review

John Baker,[1*] Kathryn Berzins,[1] Krysia Canvin,[1] Iris Benson,[2] Ian Kellar,[3] Judy Wright,[4] Rocio Rodriguez Lopez,[4] Joy Duxbury,[5] Tim Kendall[6] and Duncan Stewart[7]

[1]School of Healthcare, University of Leeds, Leeds, UK
[2]Mersey Care NHS Foundation Trust, Prescot, UK
[3]School of Psychology, University of Leeds, Leeds, UK
[4]Leeds Institute of Health Sciences, University of Leeds, Leeds, UK
[5]Faculty of Health, Psychology and Social Care, Manchester Metropolitan University, Manchester, UK
[6]NHS England, Redditch, UK
[7]Department of Health Sciences, University of York, York, UK

*Corresponding author j.baker@leeds.ac.uk

Objectives: The study aimed to provide a mapping review of non-pharmacological interventions to reduce restrictive practices in adult mental health inpatient settings; classify intervention components using the behaviour change technique taxonomy; explore evidence of behaviour change techniques and interventions; and identify the behaviour change techniques that show most effectiveness and those that require further testing.

Background: Incidents involving violence and aggression occur frequently in adult mental health inpatient settings. They often result in restrictive practices such as restraint and seclusion. These practices carry significant risks, including physical and psychological harm to service users and staff, and costs to the NHS. A number of interventions aim to reduce the use of restrictive practices by using behaviour change techniques to modify practice. Some interventions have been evaluated, but effectiveness research is hampered by limited attention to the specific components. The behaviour change technique taxonomy provides a common language with which to specify intervention content.

Design: Systematic mapping study and analysis.

Data sources: English-language health and social care research databases, and grey literature, including social media. The databases searched included British Nursing Index (BNI), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials (CCRCT), Cochrane Database of Systematic Reviews (CDSR), Database of Abstracts of Reviews of Effects (DARE), EMBASE, Health Technology Assessment (HTA) Database, HTA Canadian and International, Ovid MEDLINE®, NHS Economic Evaluation Database (NHS EED), PsycInfo® and PubMed. Databases were searched from 1999 to 2019.

Review methods: Broad literature search; identification, description and classification of interventions using the behaviour change technique taxonomy; and quality appraisal of reports. Records of interventions to reduce any form of restrictive practice used with adults in mental health services were retrieved and subject to scrutiny of content, to identify interventions; quality appraisal, using the Mixed Methods Appraisal Tool; and data extraction, regarding whether participants were staff or service users, number of

participants, study setting, intervention type, procedures and fidelity. The resulting data set for extraction was guided by the Workgroup for Intervention Development and Evaluation Research, Cochrane and theory coding scheme recommendations. The behaviour change technique taxonomy was applied systematically to each identified intervention. Intervention data were examined for overarching patterns, range and frequency. Overall percentages of behaviour change techniques by behaviour change technique cluster were reported. Procedures used within interventions, for example staff training, were described using the behaviour change technique taxonomy.

Results: The final data set comprised 221 records reporting 150 interventions, 109 of which had been evaluated. The most common evaluation approach was a non-randomised design. There were six randomised controlled trials. Behaviour change techniques from 14 out of a possible 16 clusters were detected. Behaviour change techniques found in the interventions were most likely to be those that demonstrated statistically significant effects. The most common intervention target was seclusion and restraint reduction. The most common strategy was staff training. Over two-thirds of the behaviour change techniques mapped onto four clusters, that is 'goals and planning', 'antecedents', 'shaping knowledge' and 'feedback and monitoring'. The number of behaviour change techniques identified per intervention ranged from 1 to 33 (mean 8 techniques).

Limitations: Many interventions were poorly described and might have contained additional behaviour change techniques that were not detected. The finding that the evidence was weak restricted the study's scope for examining behaviour change technique effectiveness. The literature search was restricted to English-language records.

Conclusions: Studies on interventions to reduce restrictive practices appear to be diverse and poor. Interventions tend to contain multiple procedures delivered in multiple ways.

Future work: Prior to future commissioning decisions, further research to enhance the evidence base could help address the urgent need for effective strategies. Testing individual procedures, for example, audit and feedback, could ascertain which are the most effective intervention components. Separate testing of individual components could improve understanding of content and delivery.

Study registration: The study is registered as PROSPERO CRD42018086985.

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Supplementary material can be found on the NIHR Journals Library report page (https://doi.org/10.3310/hsdr09050).

Supplementary material has been provided by the authors to support the report and any files provided at submission will have been seen by peer reviewers, but not extensively reviewed. Any supplementary material provided at a later stage in the process may not have been peer reviewed.

Glossary

Behaviour change technique A specific, irreducible, active component of an intervention designed to change behaviour, for example providing 'information about health consequences'.

Behaviour change technique taxonomy A list of 93 behaviour change techniques organised into 16 clusters, for standardised reporting of behaviour change interventions. Note that the taxonomy was published in US English and, therefore, US spelling is used here when referring to behaviour change technique taxonomy terms.

Chemical restraint The use of medication that is intended to prevent, restrict or subdue movement of any part of the service user's body.

Evaluations Evaluations of interventions are reported in research articles and anecdotal reports; replication studies and follow-up studies are counted as separate evaluations; reports of different analyses from the same study are counted as a single evaluation.

Instructions Instructions for the performance of an intervention.

Intervention Action or actions intended to address restrictive practices in adult mental health acute settings, for example a staff training initiative with or without organisational change. Some interventions are developed within and for an individual setting. Others may be well-known interventions that have been developed previously and are applied across several time periods or settings.

Isolation Any seclusion or segregation that is imposed on a service user.

Manual restraint A hands-on method of physical restraint.

Mechanical restraint A method of physical intervention involving the use of equipment.

Mixed Methods Appraisal Tool A tool suitable for appraising studies with diverse designs.

Pro re nata medication Medication given when needed, rather than at a regular time.

Procedures The actions taken as part of intervention, for example a training session.

Restrictive practices Deliberate actions undertaken with the aim of restricting an individual's movement, liberty and/or freedom to act independently. The intervention is intended to take rapid control of a dangerous situation where there is a real possibility of harm to the person or others.

Seclusion The confinement of a service user in a room, which may be locked.

List of abbreviations

AHRQ	Agency for Healthcare Research and Quality
BCT	behaviour change technique
BNI	British Nursing Index
CCTR	Cochrane Central Register of Controlled Trials
CCTV	closed-circuit television
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CPI	Crisis Prevention Institute
CQC	Care Quality Commission
DARE	Database of Abstracts of Reviews of Effects
DASA	Dynamic Appraisal of Situation Aggression
DASA-IV	Dynamic Appraisal of Situation Aggression – Inpatient Version
EQUATOR	Enhancing the QUAlity and Transparency Of health Research
EssenCES	Essen Climate Evaluation Schema
HDAS	Healthcare Databases Advanced Search
HDU	high-dependency unit
HTA	Health Technology Assessment
INIST-CNRS	Institut de l'information scientifique et technique – Centre national de la recherche scientifique
ISRRI	Inventory of Seclusion and Restraint Reduction Interventions
MMAT	Mixed Methods Appraisal Tool
NHS EED	NHS Economic Evaluation Database
NICE	National Institute for Health and Care Excellence
NIH	National Institutes of Health
NLM	National Library of Medicine
NR	not reported
PCC-SR	Patient–Staff Conflict Checklist Shift Report
PDSA	plan, do, study, act
PERT	psychiatric emergency response team
PICU	psychiatric intensive care unit
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRN	pro re nata
RCP	Royal College of Psychiatrists
RCT	randomised controlled trial
SAMSHA	Substance Abuse and Mental Health Services Administration
SD	standard deviation
SOAS	Staff Observation Aggression Scale
SOAS-R	Staff Observation Aggression Scale – Revised
WHO	World Health Organization
WIDER	Workgroup for Intervention Development and Evaluation Research

Plain English summary

Service users can become upset and aggressive in adult inpatient services for the treatment of mental illness. Staff may respond by holding service users down or putting them in a room on their own. These are called 'restrictive practices' and can be harmful for service users and staff. Many interventions exist for reducing the use of restrictive practices but we do not know which ones work, or why. Staff training could reduce the use of restrictive practices by encouraging staff to behave differently, for example by learning better ways of talking to somebody who has become aggressive or is self-harming.

There is a list of 93 techniques for changing behaviour, which is like a dictionary. You can look up terms that best describe parts of an intervention to make it easier to describe and compare them. We wanted to see how many different interventions we could find, and describe them using this list.

We identified all of the interventions that we could find and recorded information such as whether participants were staff or service users, the number of participants involved, study setting, location and how success was measured. We looked in detail at the interventions and described the techniques using the list. We also assessed the quality of research about the interventions.

We found 150 different interventions. Common techniques involved setting goals for staff to work towards, such as reducing how often they use a restrictive practice; educating staff; changing the environment to prevent incidents; and giving staff feedback about incidents. The most successful interventions were more likely to include these common techniques.

To our knowledge, this study is the first to describe these interventions in a standard way. It will help researchers, policy-makers and clinicians to describe and understand interventions in order to reduce restrictive practices. Better understanding could lead to better safety for service users and staff.

Scientific summary

Background

Incidents involving violence and aggression are a frequent occurrence in adult mental health inpatient settings. They are often managed using restrictive practices, which are defined by the Department of Health and Social Care as:

> *[. . .] deliberate acts on the part of other person(s) that restrict an individual's movement, liberty and/or freedom to act independently in order to: take immediate control of a dangerous situation where there is a real possibility of harm to the person or others if no action is undertaken [. . .]*
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Examples include restraint, seclusion, injection of sedating drugs and constant observation. Growing international consensus suggests that restrictive practices are used too frequently, particularly given the significant risks of physical and psychological harm to both service users and staff.

In the UK, local NHS and private providers have invested significant resources in interventions to reduce restrictive practices. Some, such as *Safewards* (Bowers L, James K, Quirk A, Simpson A, Stewart D, Hodsoll J, SUGAR. Reducing conflict and containment rates on acute psychiatric wards: the Safewards cluster randomised controlled trial. *Int J Nurs Stud* 2015;**52**:1412–22; Cabral A, Carthy J. Can Safewards improve patient care and safety in forensic wards? A pilot study. *Br J Ment Health Nurs* 2017;**6**:165–71), have been evaluated and reported in the literature, but other interventions that are being implemented have not been reported in the research literature and lack empirical support. However, the content of these interventions and the mechanisms through which they might change behaviour are not fully understood. Furthermore, it is not known to what extent those interventions that have shown reductions in the use of restrictive practices have features in common. The development of future interventions to reduce restrictive practices is hampered by these limitations and there have been repeated calls for interventions to be better described and evaluated.

The behaviour change technique taxonomy is a list of 93 behaviour change techniques organised into 16 thematic clusters, for standardised reporting of behaviour change intervention. Developed to improve reporting of interventions, it provides a common language that specifies the content and mechanisms by which behaviour is changed, and can be used prospectively in intervention design and retrospectively in intervention review. Interventions to reduce restrictive practices use a variety of behaviour change techniques; for example, role-playing verbal de-escalation strategies could be coded as 'behavioural practice/rehearsal' involving 'social comparison' and 'feedback on behaviour'.

This study takes an essential first step to future intervention development by identifying the range of interventions that have been implemented, their specific components and how they relate to outcomes.

Aims and objectives

The aims of this study were to identify, standardise and report both the clinical effectiveness and cost-effectiveness of components of interventions that seek to reduce restrictive practices in adult mental health inpatient settings, using the behaviour change technique taxonomy.

The study objectives were to:

- provide an overview of interventions aimed at reducing restrictive practices in adult mental health inpatient settings
- classify components of those interventions implemented in terms of behaviour change techniques and determine their frequency of use
- explore evidence of clinical effectiveness and cost-effectiveness by examining behaviour change techniques and intervention outcomes
- identify behaviour change techniques showing the most promise of clinical effectiveness and cost-effectiveness and that may require testing in future high-quality evaluations.

Methods

Design

This was a systematic mapping study and behaviour change technique analysis incorporating three stages: (1) a broad literature search to identify relevant records, (2) data extraction and (3) analysis, including description and classification of interventions using the behaviour change technique taxonomy, alongside quality assessment of retrieved records and exploration of evidence of effectiveness.

Data sources

It was known that, in addition to well-known interventions reported in the academic literature, there were reports of numerous standalone interventions implemented in individual services. Not all of these would appear in a search restricted to published research literature. Therefore, the search strategy was augmented by an environmental scan to include interventions and programmes that were specific to individual settings. This approach facilitated the identification of a more diverse range of records than could be identified solely from published literature. The databases searched included British Nursing Index (BNI), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials (CCRCT), Cochrane Database of Systematic Reviews (CDSR), Database of Abstracts of Reviews of Effects (DARE), EMBASE, Health Technology Assessment (HTA) Database, HTA Canadian and International, Ovid MEDLINE®, NHS Economic Evaluation Database (NHS EED), PsycInfo® and PubMed. Databases were searched from 1999 to 2019.

Study selection

The inclusion criteria were broad: English-language records dating from 1999 to 2019 of interventions aiming to reduce the use of restrictive practices by staff in adult (including older people) inpatient mental health services (including psychiatric intensive care units, acute and forensic services). Interventions may or may not have been implemented. The starting date of 1999 was decided by the date of introduction of the UK National Service Framework for Mental Health, which precipitated new quality standards and a significant shift in the orientation of services. Because of the research team's prior knowledge of the paucity of the evidence base, there were no restrictions on study design and no quality threshold was imposed. Searches were conducted from February to June 2018, and re-run in April 2019.

Data extraction and analysis

We extracted data on whether participants were staff or service users, number of participants, study setting, intervention type, procedures and fidelity, and the Mixed Methods Appraisal Tool was used to establish whether or not the intervention had been evaluated. Where available, outcome measures and findings were extracted. The Mixed Methods Appraisal Tool was used to assess the quality of all the included records.

The behaviour change technique taxonomy was applied to all of the interventions identified in the included records. Intervention data were examined for content, including the range and frequency of procedures, as well as overarching patterns. Behaviour change technique data were analysed by reporting overall percentages of behaviour change techniques across the interventions, then by behaviour change

technique cluster, for example 'goals and planning'. Procedures used within interventions, for example training, audit and review, or service user involvement, were then described and classified in terms of behaviour change techniques. Outcomes were related back to behaviour change technique content.

Results

The searches identified 18,451 records in the published literature and 1985 in the grey literature, including 99 from social media. A further 31 were identified from forward searching and contact with authors. Free online artificial intelligence software Abstrackr beta version (Center for Evidence Synthesis in Health, Brown University, Providence, RI, USA) was used to assist with screening. From the records identified, 426 full texts were retrieved and 175 were included. These 175 records varied in type (e.g. research report, journal article, slides, video).

This study identified 150 unique interventions, the majority of which aimed to reduce the use of seclusion or restraint (or both). Eleven aimed to reduce the use of pro re nata medication. None targeted rapid tranquillisation. Most interventions comprised multiple procedures (range 2–10 procedures); the most common procedures were training/education and changes to nursing approaches (e.g. implementing *Trauma-Informed Care*).

Based on the Mixed Methods Appraisal Tool screening questions, there were 109 evaluations. A non-randomised design was reported in 103 evaluations and there were six randomised controlled trials. Several evaluations were not considered to have reported complete outcome data and only two-thirds adequately accounted for confounders. There was very little reporting of modifications and fidelity to the intervention protocol. There were six randomised controlled trials, of which five reported complete outcome data, four did not describe any deviation from the protocol, three had comparable groups at baseline and described rigorous randomisation processes, two reported blinding and four were cluster randomised controlled trials.

Seventy of the 109 evaluations reported multiple outcome measures (e.g. number of restraints and use of pro re nata medication). Studies used 40 standardised measures, in addition to non-standardised measures and routine data. Service users were involved in 48 interventions, with the type and extent of involvement varying greatly. Eighteen interventions reported some cost data.

The 150 identified interventions were coded for behaviour change technique content using the behaviour change technique taxonomy. They contained 43 of a possible 93 behaviour change techniques and the number of behaviour change techniques identified per intervention ranged from 1 to 33 (mean 8 techniques).

The identified behaviour change techniques were contained within 14 of the behaviour change technique taxonomy's 16 clusters. Behaviour change technique 4.1 (behaviour change technique 1 in cluster 4 of the taxonomy), 'instruction on how to perform the behaviour', was detected in 137 interventions. However, the first four clusters contained over two-thirds of the behaviour change techniques. These clusters were:

- 'Goals and planning' – solving problems by identifying actions required, and setting and reviewing goals.
- 'Shaping knowledge' – including instructions on performing the behaviour and information about antecedents.
- 'Antecedents' – including factors that could influence whether or not restrictive practices can be avoided, typically in terms of preventing situations where service users might become distressed and conflict occur, by strategies such as restructuring the physical environment, adding objects to the environment and restructuring the social environment via stakeholder involvement, improving interaction between staff and service users, and promoting social contact.

- 'Feedback and monitoring' – including the monitoring of ward data, and whether or not and how feedback was given. Both feedback and monitoring related primarily to outcomes, such as de-escalation or reduced restrictive practices, although there was some indication of monitoring of behaviour at individual, ward or system level.

Behaviour change techniques were identified on 1160 occasions within the 150 interventions. Of these 1160, 22% ($n = 257$) were in the categories 'goals and planning', 17% ($n = 193$) in 'shaping knowledge', 15% ($n = 171$) in 'antecedents' and 11% ($n = 133$) in 'feedback and monitoring'. Behaviour change techniques relating to 'self-belief' and 'covert learning' were not detected.

The same 43 behaviour change techniques, in the same ranking (1–9), were detected in interventions that had been evaluated and found to have statistically significant findings. Procedures within interventions were disaggregated and their behaviour change techniques identified. The most commonly used procedures were training, audit and feedback and nursing changes. Training was mapped onto the behaviour change techniques 'instruction on how to perform the behaviour' and 'reframing perspectives'. Audit and feedback were mapped onto the behaviour change techniques 'feedback on outcomes of behaviour' and 'problem-solving'. Nursing changes were mapped onto the behaviour change techniques 'restructuring the social environment' and 'problem-solving'.

The literature around behaviour change interventions to reduce restrictive practices in adult mental health inpatient settings is diverse in scope, format and quality. Owing to the similarity of behaviour change techniques used across all interventions with those that had been evaluated and reported positive findings, it was not possible to identify specific behaviour change techniques that show most promise of effectiveness. The findings describe the evidence, detailing what interventions consist of in terms of different procedures, and what behaviour change techniques are used within those procedures. This supports future work to develop more testable theory-driven interventions.

Limitations

The search strategy combined traditional search techniques for retrieving research and grey literature with a scanning approach to identify potential alternative sources of relevant material. This had the advantage of enabling the retrieval of diverse records that reported intervention content and was useful for mapping the number and range of interventions; however, the diverse quality of reporting in some records retrieved in this way presented a challenge for the meaningful assimilation of findings. For example, a lack of detailed description of interventions may have masked the presence of behaviour change techniques that, consequently, were not detected. The finding that the evidence was weak restricted the scope of the study to examine the effectiveness of behaviour change techniques used in interventions. The literature search was restricted to English-language records.

Implications for policy and practice

Service providers have an urgent need for high-quality evidence regarding the effectiveness of interventions to reduce restrictive practices. At present, these findings suggest that there is a tendency for individual providers to develop and deliver ad hoc untested interventions or to implement known interventions inconsistently. The evaluations of such interventions often report positive findings that imply that they are effective. The trustworthiness of such claims is undermined, however, by poor reporting of intervention content, poor reporting of measurements of fidelity, lack of a theoretical basis, testing using the least robust methodologies, and few studies showing statistically significant results. Without reliable evidence, service providers may be using scarce resources to implement ineffective intervention components.

Research recommendations

Existing evaluations reveal little about which aspects of an intervention are effective. There are commonly occurring behaviour change techniques identified across interventions. Without testing individual intervention components, it remains unclear which components – or combination of components – might be effective and whether that effect is limited to the incidence or duration of one or all restrictive practices. Rigorous, theory-driven testing of individual components is required.

The evaluations identified in this review used a variety of outcome measures that were reported in different ways, for example incidents per service user or per day. This heterogeneity makes it difficult to compare studies and meta-analyse outcome data. Despite this, one gap that remains is the underuse of service user-reported outcome measures. The development of such outcome measures could add a useful dimension that may shed further light on intervention effectiveness.

Conclusions

Despite numerous policy initiatives, there are ongoing concerns about the use of restrictive practices in inpatient mental health settings, and their impact on the psychological and physical welfare of service users and staff. Unlike previous reviews, this study was broad in scope, not limited to a single restrictive practice or type of intervention. It is, therefore, the first, to our knowledge, to comprehensively map the procedures and effectiveness of interventions available to reduce restrictive practices, and to describe their content in terms of behaviour change techniques. It revealed that many interventions have been implemented over the past two decades targeting multiple restrictive practices, using multiple procedures and, where they have been evaluated, multiple outcome measures. Very few were theory based and most reported positive findings. The synthesis revealed that many of these interventions have clusters of behaviour change techniques in common, suggesting that these interventions have been developed based on an unstated set of assumptions of how they are intended to work and through what mechanisms. Making these assumptions explicit through the use of theory would enable the testing, measurement and refinement of interventions to maximise their effectiveness. Future interventions should test individual procedures (and their constituent components) in isolation and be thoroughly described.

Study registration

This study is registered as PROSPERO CRD42018086985.

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Chapter 1 Background

This chapter sets out the background and study context, explaining why it is important to enhance knowledge about restrictive practices in adult mental health inpatient settings and how the behaviour change technique (BCT) taxonomy can contribute to the development and understanding of interventions.

Restrictive practices in adult mental health inpatient settings

Incidents that threaten service user and staff safety, such as violence, aggression and self-harm, are not uncommon in mental health inpatient settings.[1] The Royal College of Psychiatrists' (RCP) survey of violence in inpatient mental health settings in 2007[2] found violence and aggression to be commonplace, experienced by approximately three-quarters of all staff and one-third of service users. They are often managed using restrictive practices, which are defined by the Department of Health and Social Care as:

> *'[. . .] deliberate acts on the part of other person(s) that restrict an individual's movement, liberty and/or freedom to act independently in order to: take immediate control of a dangerous situation where there is a real possibility of harm to the person or others if no action is undertaken . . .'*
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Examples of restrictive practices include restraint (manual or mechanical holding of the service user), seclusion (isolating the service user in a locked room), coerced intramuscular injection of sedating drugs and constant observation (service user within eyesight or arm's reach of one or more supervising nurses at all times).

Restrictive practices are widely used internationally[4] although reliable prevalence data can be hard to find, and are influenced by discrepancies in definition and recording methods.[5] Cultural differences mean that across countries some forms of restrictive practice are more acceptable than others. For example, mechanical restraint is seen as an acceptable treatment in acute settings in the USA but unacceptable in UK acute settings.[6] Despite such differences, there is an emerging international consensus that restrictive practices are used too frequently.[7] Restrictive practices can cause serious physical and even lethal harm as well as psychological injury to service users and staff.[8] Face-down restraint has been associated with positional asphyxia.[8] Restrictive practices can also have a profoundly detrimental effect on therapeutic relationships between staff and service users.[9] Substantial costs arise from staff sickness[10] and resource-intensive observation of service users.[11]

Interventions to reduce restrictive practices

Restrictive practices began to attract wider attention following the occurrence of deaths attributed to their use.[12] In England and Wales, the Mental Health Units (Use of Force) Act 2018 has mandated that Mental Health Trusts must reduce the use of restrictive practices.[13] Despite a plethora of policies and initiatives in the UK and internationally to reduce the use of restrictive practices, there is no robust evidence to support the use of one intervention in preference to another. Furthermore, it has been noted that where one restrictive practice is reduced another might increase.[8,14] *Safewards*, an initiative to reduce conflict (violence, absconding, self-harm, rule breaking and medication refusal) and containment (restraint, seclusion and sedation),[15] showed a reduction in incidences of both in the intervention arm.[16] It demonstrated that innovative, evidence-based interventions can reduce violence and containment usage in settings that are contending with the resource limitations characteristic of UK acute mental health services. A trial of *Six Core Strategies*[17] demonstrated a reduction in 'seclusion–restraint' and observation days, although no differences in terms of violence.

Observation studies have reported the reduction of restrictive practices and violent behaviours after the delivery of interventions,[18–20] although they are generally considered low quality, and other studies have reported no effect.[21] One study showed some evidence in favour of restraint training over de-escalation training.[22]

In the UK, *Safewards*,[16] *Six Core Strategies*[23] and *No Force First*[24] are examples of initiatives that have been promoted and adopted by some NHS Mental Health Trusts, while the National Coordinating Centre for Mental Health is promoting a quality improvement programme. However, the specific content of such initiatives and programmes has not been examined in detail; hence, the mechanisms through which they might change behaviour are not fully understood and, furthermore, it is not known whether or not interventions leading to reductions in the use of restrictive practices share common features.

Previous reviews[14,18,25–31] have highlighted the paucity of research in this area and poor quality of the evidence. One study concluded that there is a lack of evidence from controlled studies to support the use of current non-pharmacological approaches to violent behaviour.[32] Although there is a clear imperative to identify the best-quality studies to reliably understand how effective an intervention is, this has little applicability in practice if the choice of interventions is extensive while awareness of their effectiveness is limited. Service providers thus require some way of knowing what interventions are available and how comparable they are.

There are repeated calls for restrictive practices reduction guidance to be based on robust transparent studies,[33,34] and for interventions to be better described and better evaluated. A further challenge for reviewers of behavioural (non-pharmacological) interventions is how to synthesise content, especially when there are vast differences between procedures. Livingston *et al.*[18] reviewed training-based interventions to reduce restrictive practices. They highlighted the difficulty of reaching conclusions because of 'different types of aggression management programs, which contain a variety of approaches' [and that the] 'focus, curriculum, and duration of the training vary substantially from one program to another'.[18] Another review found that only 39% of interventions were adequately described when published.[35] This does not necessarily mean that interventions are not described, but does suggest the absence of a common language with which to describe intervention components.[36,37]

The behaviour change technique taxonomy

To address this issue, a taxonomy of BCTs was developed.[38] The taxonomy provides a reliable method of precisely specifying components of programmes in a transparent manner, using an established language. It is intended for application across theory-based programmes aimed at both patients and professionals.

The BCT taxonomy built on a previous taxonomy devised from content analysis of reports of interventions,[39] and followed a series of context-specific taxonomies focusing on physical activity and healthy eating,[40] and prevention of risky sexual behaviour,[41] professional behaviour change,[42] safe drinking[43] and smoking cessation support.[44,45] It differed from these in that it was designed to be comprehensive and to encompass a wide range of behaviour change techniques. This taxonomy is widely used internationally to report on programmes and synthesise evidence.[46,47]

The development of the BCT taxonomy involved an empirical approach aiming to achieve international consensus around content. Three distinct methodologies were employed: (1) Delphi methods were used to develop labels and definitions of the individual BCTs, (2) the reliability of coding these BCTs was tested and used to highlight BCTs requiring refinement by the study team, and (3) an open-sort grouping task was delivered via an online computer program, with statistical techniques, including hierarchical cluster analysis, applied to generate a hierarchical structure of technique clusters designed to increase the speed and accuracy of recall during use of the taxonomy.

The BCT taxonomy enables the robust synthesis of evidence that has previously been problematic to unpick and compare. A BCT is defined as 'an observable, replicable, and irreducible component of a programme designed to alter or redirect causal processes that regulate behaviour'.[38] The taxonomy comprises 93 BCTs (e.g. 'problem-solving', 'instruction on how to perform the behaviour', 'social comparison') in 16 thematic clusters, such as 'goals and planning' (solving problems by identifying actions required, and setting and reviewing goals) 'shaping knowledge' (including instructions on performing the behaviour and information about antecedents), 'antecedents' (including factors that could influence whether or not restrictive practices can be avoided) and 'feedback and monitoring' (including the monitoring of ward data, and whether or not and how feedback was given).

All interventions to reduce restrictive practices use BCTs. For example, role-playing verbal de-escalation strategies could be coded as 'rehearsal of relevant skills' involving 'social comparison', 'monitoring of emotional consequences' and 'feedback on behaviour'. An expert delivering information about the risks of restraint could involve 'information about health consequences' delivered by a 'credible source'. The BCT taxonomy therefore provides a reliable method of precisely specifying intervention components and the mechanisms by which behaviour is changed.[36,37] Use of this standardised language promotes transparency through more accurate reporting and replication,[45] as well as more successful implementation with proven effectiveness.[38]

The taxonomy can be used prospectively in intervention design[48,49] by assisting with the identification of BCTs potentially associated with effectiveness.[38] It can also be used retrospectively to describe completed interventions and has been used internationally to report interventions[43] and synthesise evidence,[41,50] including reanalysing existing interventions to explore their components.[40]

Chapter 2 Methods

This chapter sets out the study aim and objectives and describes the methods used in a three-stage study design including literature search, data extraction and analysis.

Aim and objectives

The aim of this study was to identify, standardise and report the effectiveness of components of interventions that seek to reduce restrictive practices in adult mental health inpatient settings using the BCT taxonomy.[39]

The study objectives were to:

- provide an overview of interventions aimed at reducing restrictive practices in adult mental health inpatient settings
- classify components of those interventions implemented in terms of behaviour change techniques, and determine their frequency of use
- explore evidence of clinical effectiveness and cost-effectiveness by examining behaviour change techniques and intervention outcomes
- identify behaviour change techniques showing the most promise of clinical effectiveness and cost-effectiveness, and that require testing in future high-quality evaluations.

Design

The study design comprised three stages. The purpose of stage 1 was to systematically search all English-language reports of interventions to reduce restrictive practices in inpatient mental health settings (objective 1). The aim of stage 2 was to extract data for analysis using the validated, structured BCT taxonomy to identify the content of the interventions (objective 2). The aim of stage 3 was to analyse the content of interventions using the BCT taxonomy, alongside a critical appraisal of all retrieved records using the Mixed Methods Appraisal Tool (MMAT), an appraisal tool specifically designed for mixed-methods reviews.[51] The application of the MMAT is described in *Assessment of study quality using the Mixed Methods Appraisal Tool*. The study design is illustrated in *Figure 1* (see *Chapter 3*).

Stage 1: literature search

Introduction

Stage 1 focused on ascertaining the range and characteristics of interventions, irrespective of evidence of effectiveness, which involved systematically searching and reviewing all reports of interventions seeking to reduce the use of restrictive practices.

The search strategy approach drew on the increasingly utilised method of mapping[52–56] to inform the purpose and output of the review. It differed from the method described in Bradbury-Jones *et al.*[52] because of the broad scope of the search and the inclusion of interventions in the current study. It was known that in addition to a small number of well-known interventions reported in the academic literature, there were numerous small-scale, standalone initiatives available for implementation in services. Not all of these would appear in a search restricted to the published research literature as they may be reported in unpublished literature or 'non-research' publications.

The search for relevant interventions records was informed by an 'environmental scanning'[57] approach suggested by Judy Wright, the project Information Specialist. Environmental scanning is a search methodology familiar in business contexts but relatively little used in health research. It permits the identification of more diverse information about an area than could be retrieved solely from published literature. In health-care settings, environmental scans have been used to inform future planning, to document evidence of current practice and to raise awareness.[57] It was therefore an appropriate choice for expanding the scope of the search strategy. Environmental scanning may involve a 'passive' approach that focuses on published and unpublished existing data or an 'active' approach where additional knowledge is generated through primary data collection.[57] In this study, a passive approach was used.

In keeping with objective 1 (to provide an overview of interventions aimed at reducing restrictive practices in adult mental health inpatient settings), the search criteria targeted diverse reports of non-pharmacological interventions aimed at changing the behaviour of inpatient adult mental health service staff to reduce restrictive practices. The scope of the searches was necessarily broad to include all records of an intervention, whether it was an evaluation or a descriptive report.[55] In order to include as many interventions as possible within the scope of the search, no quality threshold was imposed either indirectly (by restricting the search to high-impact journals)[52] or directly via the search criteria or by screening.[54,56] Inclusion was not restricted by study design.[42] Interventions that solely involved policy change and those that aimed to reduce the use of one type of restrictive practice by replacing it with another were not eligible for inclusion.

In addition to interventions intended to reduce or eliminate restrictive practices, reports of interventions designed to improve quality or reduce or manage violence were included if their procedures and/or outcome measures addressed restrictive practices. Eligibility criteria are shown in *Table 1*.

The starting date of 1999 was decided by the date of introduction of the UK National Service Framework for Mental Health,[58] which precipitated new quality standards and a significant shift in the orientation of services. Because of the research team's prior knowledge of the paucity of the evidence base, there were no restrictions on study design and no quality threshold was imposed. Searches were conducted from February until June 2018, and repeated in April 2019.

Two main searches were developed to identify interventions to reduce the use of restrictive practice in adults with mental health disorders. The first search aimed to identify reports from the academic bibliographic databases. The second search aimed to identify unpublished reports, including those occurring in the grey literature, social media and other digital resources.

TABLE 1 Eligibility criteria

Criterion	Include	Exclude
Population	Adult (including older people) mental health inpatient settings (including acute, forensic and PICU services)	Children and Child and Adolescent Mental Health Services, learning disability and organic conditions
Date	1999–2019	
Interventions	Aimed at changing the behaviour of inpatient adult mental health service staff to reduce restrictive practices. Interventions may or may not have been implemented	Pharmacological only
Outcomes	Reduce restrictive practices	
Language	English language	Non-English language

PICU, psychiatric intensive care unit.

Academic bibliographic databases search

The first search was conducted in February 2018. A wide range of academic bibliographic databases were searched for published studies, including:

- British Nursing Index (BNI)
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- Cochrane Central Register of Controlled Trials (CCTR)
- Cochrane Database of Systematic Reviews (CDSR)
- Database of Abstracts of Reviews of Effects (DARE)
- EMBASE
- Health Technology Assessment (HTA) Database
- HTA Canadian and International
- Ovid MEDLINE®
- NHS Economic Evaluation Database (NHS EED)
- PsycInfo®
- PubMed.

For full details of the databases, see *Appendix 1*.

The rationale for the academic databases was to select databases with good coverage of mental health studies and those covering studies of the nursing workforce, because the restraint reduction interventions are particularly important to this group that are dealing with aggressive and difficult situations on a ward. Two nursing databases (CINAHL and BNI), two of the largest medical databases (EMBASE and MEDLINE), the largest mental health database (PsycInfo), an evidence-based health database with good coverage of randomised controlled trials (RCTs) (Cochrane Library) and PubMed were searched to supplement the Ovid MEDLINE as they can contain some articles more recent than those included in Ovid MEDLINE. The team discussed and consented to this database selection, as proposed by the Information Specialist.

Search strategies were developed for the concepts: coercive interventions, mental health conditions and inpatients. Searches included subject headings and free-text words, identified by text analysis tools (PubReMiner), the Information Specialist (JW) and project team members. Further terms were identified and tested from known relevant papers. Searches were peer reviewed by a second Information Specialist. For full details of the search strategies, see *Appendix 2* and *Report Supplementary Material 1*.

The search was updated and re-run in April 2019 in the same databases except for DARE and NHS EED, which were not searched as they had not received further content since the 2018 search. Owing to a change in database providers, BNI and HTA databases were searched via a different database host in 2018 rather than 2019. After checking index terms, two additional terms were added to the PsycInfo search: involuntary treatment/and psychiatric hospitalisation. All other searches remained the same.

Grey literature search

The second search was run from June 2018 to August 2018 to identify unpublished (grey) literature reports in databases, websites and social media sources. For full details, see *Appendix 1*.

The list of information resources to search was created collaboratively by the project team and information specialists. Websites for charities, government health departments, health-care organisations, health-care quality agencies, mental health organisations, professional societies/colleges and training providers were selected following an exercise to gather all potentially useful websites known by the project team, and those found by an information specialist scoping search. This large list was then organised into 'types' of organisations, such as health-care quality agencies, charities and government departments, and the team refined the list to include a set of 5–10 websites to search for each group that represented different countries/regions.

The team prioritised resources that were likely to provide relevant reports from North America, Australasia and Europe. Google (Google Inc., Mountain View, CA, USA) was used to search for interventions in 30 countries specifically identified in the 2016 Legatum Prosperity Index™ (a between-nations ranking system) as having the best health systems. A structured social media search incorporated YouTube (URL: www.youtube.com; YouTube, LLC, San Bruno, CA, USA), Facebook (URL: www.facebook.com; Facebook, Inc., Menlo Park, CA, USA) and Twitter (URL: www.twitter.com; Twitter, Inc., San Francisco, CA, USA).

The search strategies used in academic databases were adapted for use in grey literature databases, websites and social media sources. Website and social media searches used search terms similar to those used in the academic database searches, but fewer of them, and multiple short searches were run per resource, rather than one complex search. This ensured that the searches were consistent with the academic databases despite the limited ability of web and social media resources to process long strings of search terms or combine multiple searches. For further detail, see *Appendix 2* and *Report Supplementary Material 1*.

In addition, an information request for unpublished interventions was sent to mailing lists for the health and medical community, clinical librarians and mental health librarians. No suggestions of restrictive practice reduction interventions were received from the mailing list information request. Project team members forwarded relevant reports they saw on their own social media accounts and through personal contacts with experts. When contact details were available, authors of identified interventions aimed at reducing the use of restrictive practices were contacted for further data. A request for information was circulated around Restraint Reduction Network members.

Backward citation searching of cited references and forward citation searching using Google and PubMed were used in order to access fuller descriptions of interventions, including development, procedures and implementation to supplement records with minimal detail, such as conference and poster abstracts, Microsoft PowerPoint® (Microsoft Corporation, Redmond, WA, USA) slides and some non-research reports. This procedure was also used to identify journal publications associated with a dissertation/thesis and published reports associated with unpublished records and non-research reports. These strategies were also supported with a Google search for authors. Individual journals were hand-searched; however, because of the disparate nature of journals reporting the study topic, no key journals were identified.

The results of the published and grey literature database and website searches were stored and de-duplicated in EndNote (Clarivate Analytics, Philadelphia, PA, USA) referencing software libraries. The results of the social media searches were stored in a Microsoft Excel® (Microsoft Corporation, Redmond, WA, USA) file.

Screening

Free online citation screening software (Abstrackr beta version, Center for Evidence Synthesis in Health, Brown University, Providence, RI, USA) was used to assist with screening. Abstrackr uses artificial intelligence to help reduce screening time by determining the relevance of papers, based on inclusion and exclusion terms entered by reviewers, and subsequently displays references in order of predicted relevance.[59]

Retrieved references were imported into Abstrackr and the following settings were selected: a pilot phase of 100, double-screening, display-all (i.e. title, authors, abstract, keywords) and order by relevance. Two researchers (KC and KB) independently screened the first 100 references, documenting their decision-making. Terms were discussed and shared to ensure maximum efficiency and coherence after screening the first 100 references, again after screening 600 and again after screening 1000. In total, 55 terms indicating relevance were entered, including restrain, intervention, psychiatry, inpatient, and the names of specific interventions of interest. In addition, 78 terms indicating irrelevance were entered,

including child, community, dementia and learning disability. The full list is provided in *Appendix 3*. Once 1500 references had been screened, no further references appeared to be relevant. Following the recommendation of Rathbone *et al.*,[60] references without an abstract were screened separately ($n = 998$) to avoid compromising Abstrackr's predictions. Screening conflicts were discussed and resolved between KC and KB. This process generated a subset of full texts to retrieve for further screening.

Stage 2: data extraction

Records were scrutinised to develop a sense of scope and content, and then extracted using a data extraction sheet informed by relevant data extraction tools.

A full list of extraction terms can be found in *Appendix 4*. Extraction was conducted using a standardised extraction tool supplemented with additional terms. The Workgroup for Intervention Development and Evaluation Research (WIDER) tool was used. WIDER was designed specifically to facilitate the identification and extraction of essential details of behaviour change interventions.[61] It comprises 20 recommendations under four broad headings for reporting behaviour change interventions: characteristics of those delivering the intervention, characteristics of the recipient, setting and mode of delivery. In order to capture the breadth of interventions identified in the retrieved records, the tool was adapted to include additional subheadings; for example, city, state/province, country, setting (type) and setting size (beds/wards) were added to subheadings under 'setting'. These subheadings were developed inductively to reflect content, while retaining the validated structure of the WIDER recommendations. The subheadings under 'setting' are relatively descriptive, reflecting the different ways in which setting was reported.

Subheadings under 'mode of delivery' were developed in a more interpretive fashion, using the constant comparison technique[62] to make judgements about whether one form of delivery was the same as or different from another. When a key detail of delivery mode was identified that did not fit under an existing subheading, another subheading was created for it.

Other headings for data extraction, for example publication type, year of publication and peer review, were drawn from modifiable Cochrane extraction templates[63] and developed with reference to the study objectives. Extraction in stage 2 applied the first two screening questions in the MMAT to identify evaluation studies. Additional information using terms from the Cochrane template included, for example, funder (if any), design and outcome measures. The application of the MMAT is described in more detail in *Assessment of study quality using the Mixed Methods Appraisal Tool*.

Two researchers (KC and KB) extracted all data into a shared Microsoft Excel spreadsheet, where the data were stored and organised. Notes and clarifications were recorded directly on the spreadsheet. Decision-making during the process of extraction was documented for transparency.

Modification

Reports of modifications to the intervention protocol were recorded, including what was modified and how.[64] In this context, modification meant any planned deviation from the original intervention protocol.

Fidelity

When fidelity was recorded, it described reports of implementation as specified by the intervention protocol.[65]

Theory

For the purposes of data extraction, theory was defined as a way of understanding, explaining and predicting behaviour, events and situations. Different scales of theory have been proposed:[66] grand, mid and small.

Small theory or programme theory is how and why an intervention is proposed to work. It sets out the components of the intervention, the outcomes and how outcomes will be measured, often in the form of a logic model or driver diagram.[67] Although a 19-item measure for the assessment of the use of theory in interventions is available,[48] it was apparent from screening and data extraction that few interventions made any use of theory, and most of the items in the measure would be recorded as 'no'. Therefore, an adaptation was developed in which any interventions that explicitly referred to theory were examined for (1) whether or not they used theory to inform intervention design and implementation and (2) whether or not they related their findings back to the theory (this criterion was adapted from the theory coding scheme).[48] For example, a judgement would be made about whether or not a training intervention that was described as being informed by social learning theory had linked its training content and delivery back to the same theory, and subsequently whether or not the findings were discussed in relation to the theory.

Not reported

The term 'not reported' (NR) was used to indicate missing information, unless there was an explicit explanation of why the information was not provided, such as that costs were not recorded or a procedure was not followed. For example, if fidelity is not reported it can be assumed neither that fidelity was unmeasured nor that it was measured and unreported. The analysis and findings presented below therefore can reflect only what was reported.

Stage 3: analysis

The aim of stage 3 was to analyse the data by describing and classifying interventions using the BCT taxonomy, alongside quality assessment of those records which reported evaluations. The application of the BCT coding manual in this study is illustrated in *Appendix 5*.

A single record could contain multiple interventions (e.g. NHS documents describing examples of good practice) and multiple records could refer to the same intervention (e.g. initial study, longitudinal study and replication study of an intervention). Records were used to complete the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (see *Figure 2*) and to report sources and formats. These are presented by type (e.g. research, tool), format (e.g. journal article, thesis) and year of publication to provide a general overview of the range of records captured by the search (see *Chapter 3*, *Characteristics of records identified*).

A distinction was made between interventions that had been reported/implemented only once (as far as could be ascertained) and others that had been reported/implemented multiple times, so that multiple records of the same intervention would not skew the analyses. Multiple reports of a single intervention were grouped together and termed an 'intervention family'. *Chapter 4* provides detailed descriptions of the interventions identified under headings corresponding to recommendations in WIDER,[61] where that information was reported. As some records contained multiple interventions and the focus here was on the content of each report, the unit of analysis was instances where an intervention was mentioned.

Records were screened using the MMAT,[68] as its first level of screening establishes whether or not a report can be categorised as an evaluation. In order to capture different evaluation designs, outcomes and findings, the unit of analysis was the evaluation. They are presented under headings corresponding to Cochrane guidance[63] (see *Chapter 4*).

Describing intervention content using the behaviour change technique taxonomy

Interventions to reduce restrictive practices use a variety of behaviour change techniques to change staff behaviour. The BCT taxonomy was used to describe and compare the content of the interventions identified. As described above, the BCT taxonomy can be retrospectively applied to completed interventions[41,46] and to synthesise evidence.[41,50]

Behaviour change technique coding

Two researchers (KB and KC) acted as coders and independently coded the documents using the BCTv1[39] as the basis for a coding manual for the data. Both researchers were trained in application of the BCT taxonomy and are experienced qualitative mental health services researchers. The analysis was also supported by NVivo 12 software (QSR International, Warrington, UK) for qualitative data analysis. NVivo provided an efficient means of storing, coding, checking and reviewing throughout the analysis. The software enables the generation of audit trails including spreadsheets with clear links to original data sets.

Twenty interventions of varying types were coded independently by both researchers before discussion about how BCTs had been identified and coded. The coding manual was developed as the two researchers (KB and KC) discussed and recorded details about how they had coded BCTs and for what reasons. Once the researchers were satisfied with the coding of this set of 20, the remainder were independently coded by one coder and then reviewed by the second. The researchers conferred when there was uncertainty and sought advice from author Ian Kellar, an expert in BCT, as required. Changes were made to the coding manual and coding to ensure consistency. Formal measures of agreement were not used because of the novelty of applying the taxonomy in this area. *Appendix 4* provides further details.

Development of the coding manual

The starting point for the coding manual was the BCTv1 taxonomy and its definition and examples of each BCT.[39] However, most of the examples in the taxonomy referred to behaviour of health-care service users rather than health-care staff. In response to this discrepancy the current study applied the approach reported in Presseau *et al.*[47] For example, regarding 'reframing' in the context of staff–patient interactions, staff are supported to think of aggression as a response to trauma, that is the communication of distress. Further examples specific to the literature were developed to consider the content of the interventions to be described. As the coding progressed, additional examples and clarification based on areas of both discrepancy and consensus were added.

There were no intervention components that did not fit into the taxonomy. Some BCTs detected were aimed at health-care staff, for example instructions on how to perform a behaviour via training. Others were aimed at mental health service users, for example using distraction to reduce feelings of aggression and some were aimed at both groups, for example generating emotional and social support by encouraging socialising on mental health wards. Again, taking the approach of Presseau *et al.*,[47] these were treated separately. In line with the study aims, the focus was BCTs targeting staff behaviour.

The taxonomy deals with BCTs concerning both behaviour and outcomes of behaviour. Outcomes can be the stopping of a behaviour (e.g. stopping smoking and improving health) or the commencement of a behaviour (e.g. exercising and reducing weight). These were distinguished by treating incidents of restrictive practices as 'outcomes' and 'behaviour' as the efforts made to reduce these (e.g. de-escalation). The interventions contained more focus on outcomes than on behaviour as these are easier to record and report; however, some interventions did encourage the examination of near-misses and successes (i.e. where restrictive practices had been avoided), perhaps through team meetings, and these were seen as examples of monitoring of behaviour rather than outcomes.

One problematic aspect of the taxonomy is its use of 'self' in terms of 'self-monitoring', 'self-reward', 'self as role model', 'valued self-identity' and 'self-talk'. The initial screening of the literature had revealed that there was very little reference to individual health-care staff at all and no self-monitoring from individuals. Therefore 'self' was interpreted in a collective sense and was applied in instances in which the ward team were, for example, self-monitoring rather than being monitored at arm's length via management. This interpretation was validated during coding, since no examples of individuals (rather than ward teams) were detected, and, in addition, many ward-based initiatives had been generated from the ward staff, rather than from management or at a broader policy level. Therefore, when it was reported that a ward recorded its own incident data, this was classified as 'self-monitoring of outcomes'.

When data were recorded centrally, this was recorded as 'monitoring of outcomes'. The other opportunity for self-monitoring was in interventions that used debriefing after an incident. If it was specified that staff were encouraged to reflect on their role in the incident, this was coded as 'self-monitoring of behaviour and/or outcomes'.

One coding decision made in relation to staff training was that, if this was mentioned at all, it was coded as BCT 4.1 'instruction on how to perform the behaviour', regardless of the level of detail (following Presseau *et al.*[47]). Sometimes, interventions referred only to staff training in de-escalation, with no further detail; it was agreed that, in this circumstance, an assumption could be made that, at the minimum, there would be instruction involved. This is not in keeping with the specified instructions for coding BCTs, but had the rationale that, if only those interventions that had gone on to describe the actual content of this training had been coded, the presence of training within the interventions would have been severely under-reported.

Several of the BCTs refer to prompts or cues. It was agreed that, where a checklist or tool had been implemented on a ward (e.g. during a risk assessment on admission), this would be coded as a 'prompt', as it prompted staff to carry out behaviour that had the intention of avoiding restrictive practices. Care planning or risk assessment were treated within the context of 'goals and planning'. This was because, although they were focused on the service user, 'goals and planning' can also refer to agreement on how staff will respond to service users' needs. 'Problem-solving, goals and planning' could also be identified in post-incident debriefing, depending on how the debriefing was described.

The difference between ward and service level in monitoring of outcomes was also seen in a number of other BCTs that could be applied at the individual staff/service user level, ward level, organisation level and policy level. For example, 'goal-setting (outcome)' was detected at all of these levels (see *Appendix 6* for further details).

Descriptive statistics were used to count which BCTs featured in each intervention to provide an overall frequency of the most commonly occurring BCTs across the data set, and what clusters they were from. It was further established which BCTs were used in interventions with particular components, for example training, or audit and review, or service user involvement.

Describing intervention outcomes and relating back to behaviour change technique content

The outcomes of evaluations were extracted and described. These outcomes were then related back to the BCTs contained in the intervention subject to evaluation. The BCTs in evaluations with both positive and negative findings were identified and described.

Assessment of study quality using the Mixed Methods Appraisal Tool

In stage 1, the primary objective was to identify and document all interventions in records that met the eligibility criteria. The quality of the records was of interest; however, although it was anticipated that the records would be diverse in quality, it was also expected that the data set would contain valuable information about the range of interventions being considered for use in practice. Therefore, no records were excluded on the basis of quality.

In the current study the MMAT[51] was used at two levels: to identify records of interventions that had been evaluated and to assess the quality of the evaluation reports. To get a sense of the quality of the evidence, the screening questions of the MMAT[51] were used during data extraction to establish whether or not the intervention had been subject to an evaluation. The MMAT was again used for further examination of evaluations during data analysis.

The MMAT was designed for use in complex systematic literature reviews that include quantitative, qualitative and mixed-methods studies. The MMAT was developed from theory and a literature review,

and has been found to have good validity.[51,68] Quantitative and qualitative studies are judged against four criteria and mixed-methods studies are judged against three. Scores are between 0% and 100%, although caution is advised against relying solely on the score, and reviewers are encouraged to provide a narrative description of the study features that lead to that score. The quantitative domain is split into three subdomains: randomised controlled, non-randomised and descriptive. The characteristics of the MMAT meant that it was selected as the most suitable tool with which to judge study quality in the context of wide-ranging research methods.

Chapter 3 Results of the literature search and a detailed description of records

This following sections present the results of each of the three stages of the review. *Figure 1* illustrates the study design with outputs.

This chapter provides an overview of the literature search results, including a PRISMA flow diagram to indicate the extraction process. It describes in detail the records identified and highlights key characteristics of the data set.

Overview of the literature search results

As illustrated in the PRISMA flow diagram in *Figure 2*, the search of academic databases identified 18,451 records, and a further 1985 records were found in the grey literature (1886 in databases and websites, 99 in social media). Backward and forward citation searches, and contact with authors generated an additional 31 records. After removal of duplicates, 15,085 records were subject to title and abstract screening, which excluded 14,659. A total of 426 records were retrieved, of which 251 were excluded following full-text screening. The final data set consisted of 175 records for extraction. Further details are available in *Appendices 1* and *2*.

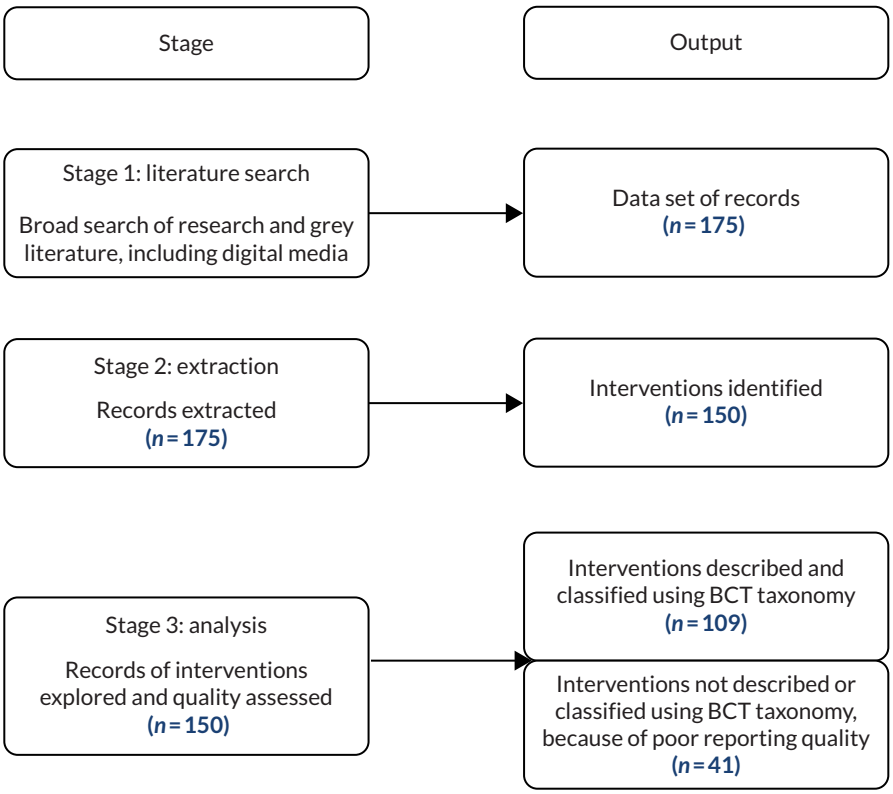

FIGURE 1 Study design with outputs.

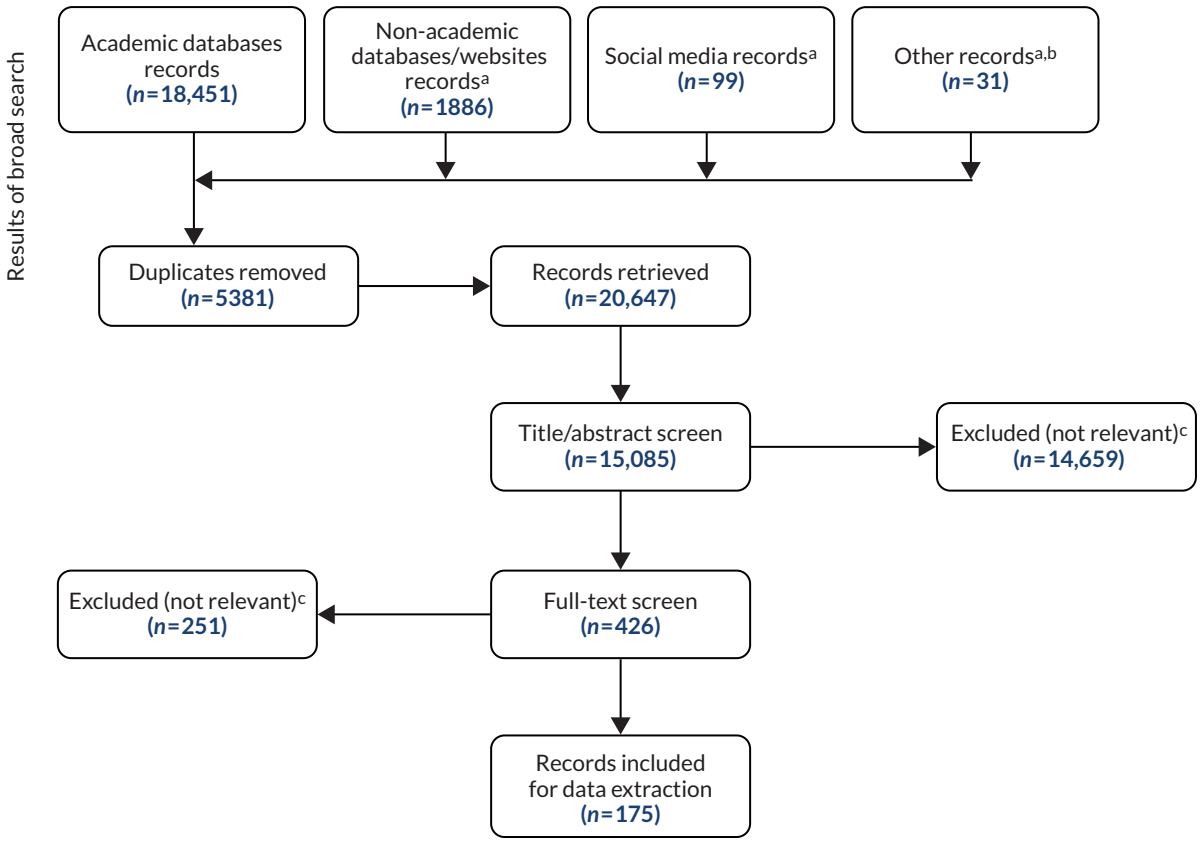

FIGURE 2 The PRISMA flow diagram. a, Grey literature: non-academic databases and websites, social media and 'other' records; b, 'other' records: forward citation searches, contact with authors; c, excluded because not relevant (e.g. record does not describe an intervention, generic policy change, replacement of one restrictive practice with another).

The data set of 175 records was diverse in terms of how interventions were reported. Some interventions occurred in more than one record, some records reported more than one intervention and some reports were mentioned in more than one record. Overall, within the data set were 221 separate records of interventions, referring to 150 interventions in total. Of these, 109 had been evaluated and 41 had not been evaluated. This detail is illustrated in *Figure 1*.

The approach to analysis was designed to address study objectives 3 and 4, that is to explore evidence of effectiveness by examining behaviour change techniques and intervention outcomes, and to identify behaviour change techniques showing most promise of effectiveness and that require testing in future high-quality evaluations. Therefore, following extraction, the reports were organised into groups according to the intervention or interventions they described. This allowed for a primary focus on the evidence for each intervention, rather than the evidence per se.

Characteristics of records identified

Records were organised by type, the most common of which was research reports (*Table 2* and see *Appendix 8*). The remaining records included brief descriptions of interventions presented in reports by organisations such as the Agency for Healthcare Research and Quality (AHRQ), the Care Quality Commission (CQC), NHS, Mind, the RCP (practice examples), and NHS trusts and hospitals (service reports); these non-research reports focused on interventions rather than a service setting (intervention reports), instructions for the performance of an intervention (instructions), links to training organisation websites (training links) and tools used as part of an intervention (tools). The majority of these were journal articles but they also included websites, leaflets, theses,[69–75] abstracts,[76–81] booklets,[82–87] slides,[84,88–92] videos,[93–96] a podcast[97] and a course syllabus.[98]

TABLE 2 Characteristics of records

Record characteristic	Number of records ($n = 175$)	%
Record type		
Research reports	121	69
Service reports	15	9
Tools	14	8
Training links	9	5
Intervention reports	7	4
Practice examples	6	3
Instructions	3	2
Format		
Journal article	116	66
Website	16	9
Leaflet/handout	10	6
Booklet	8	5
Thesis/dissertation	7	4
Slides	6	3
Abstract	6	3
Video	4	2
Podcast	1	1
Syllabus	1	1
Year of publication		
1999–2004	21	12
2004–9	24	14
2009–14	49	28
2015–19	61	35
No date	20	11

The number of records available steadily increased over the search period (i.e. 1999–2019), peaking at 20 in 2017, as illustrated in *Figure 3*. More than double the number of records in the period 2009–19 ($n = 111$) were identified compared with the previous 10-year period ($n = 45$). Twenty records were undated. These comprised all instructions, an intervention report and a service report (both in slide format), six tools (three of which were websites), the case examples on the AHRQ and RCP websites, and seven training links (three of which were videos). The context and content of these records indicated that they fell within the inclusion criteria.

The distinction between records, standalone interventions and intervention families

The 175 records that were identified reported a total of 150 unique interventions (see *Figure 1*). Of these, 121 records reported standalone interventions. The remaining 54 records contained 100 references to 29 intervention families. Intervention families consisted of interventions with multiple records, sometimes in different formats and some of which have been implemented (and evaluated) multiple times (see *Appendix 7*). The intervention for which the most records were identified was

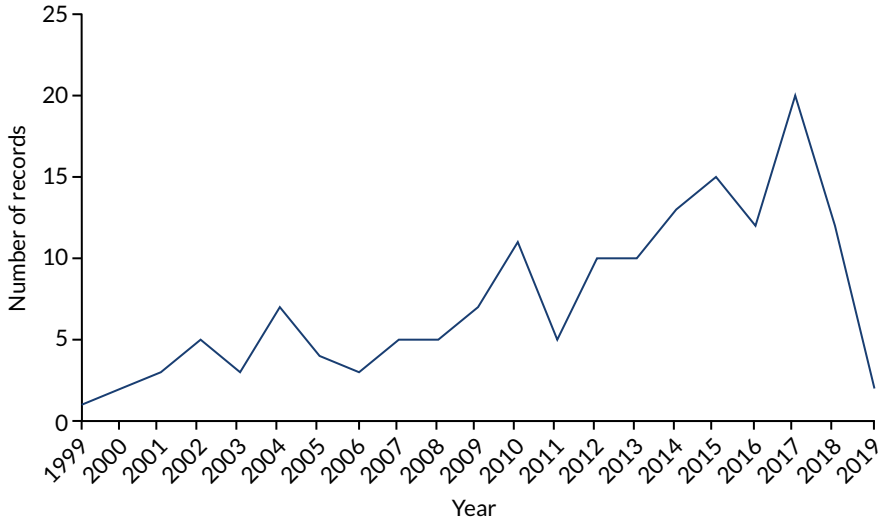

FIGURE 3 Records by year.

Six Core Strategies ($n = 18$), including research reports, intervention reports, service reports and tools. With the exception of four records that pertained to two studies respectively,[23,99] all other records were unrelated to each other – there were no follow-up or replication studies. Similarly, 10 records were identified for *Safewards*, which were unrelated research reports except for two that reported the same study in different formats.[88,100] Just three interventions had replication studies: *City Nurse*,[101,102] *Patient Focused Nursing*[103,104] and *Review*.[105,106] Two interventions had follow-up studies: *Initiatives to Reduce Seclusion and Restraint*[107,108] and *Open Door Policy*.[109–111] One intervention (*Brøset Violence Checklist*[112–114]) had been evaluated in a pilot and a subsequent study. In the case of six interventions (*Beacon Project*,[115,116] *Recovery Based Principles*,[6,117] *Early Recognition Method*,[118,119] *REsTRAIN Yourself*,[22,85,87,120,121] *Scottish Patient Safety Programme for Mental Health*[91,122–124] and *Talk First*[83,86,125,126]), the multiple records related to the same application or study of that intervention, often in different formats.

Chapter 4 Description of the interventions and evaluations

As per objective 1, and in keeping with the mapping approach, this chapter documents the overarching characteristics of the 150 interventions identified, including their scope and common features.

Comprehensiveness and consistency of reporting

A great deal of information was missing from the records about key aspects of the interventions. Recipient, setting, mode of delivery and aims were well reported but often lacked detail, whereas development, dose, who it was delivered by, and modification and fidelity were poorly reported (*Table 3*). Only 12% did not report setting. Remarkably few details were provided about who delivered the intervention, to whom, how, for how long or how often. These were usually ambiguous, describing implementation in a ward/unit, hospital or trust/administrative area without providing details of whether the sample consisted of staff and/or service users, front-line and/or managerial/administrative staff or how many of each were exposed to the intervention. Few specified whether the intervention was aimed at one or multiple professions. Most records did not include information regarding modification of or fidelity to the intervention protocol or the assumed change process that informed the intervention development (see *Table 3*).

Intervention setting

Clinical setting

Sixty-seven interventions (45%) did not provide any detail about the clinical setting other than it being adult inpatient (see *Appendix 9*). A further 27 interventions (18%) did not report clinical setting as they were not reporting implementation, for example training links. The intervention that has been applied in the widest clinical settings is *Six Core Strategies*. Six standalone interventions[127–132] had been implemented in multiple settings within the same intervention/study, as had four intervention families (i.e. interventions with multiple records): *Six Core Strategies* (in acute and secure wards); *Brøset Violence Checklist* [in acute wards and psychiatric intensive care units (PICUs)]; *Tower Hamlets Violence Reduction Collaborative* (in multiple acute settings); and *Initiatives to Reduce Seclusion and Restraint* (in multiple, unreported settings). A further five interventions had been applied across various clinical settings: the *Scottish Patient Safety Programme for Mental Health* had been implemented in acute, PICU and forensic settings, the Dynamic Appraisal of Situation Aggression – Inpatient Version (DASA-IV) had been implemented in acute and high-dependency wards, the *Novel Seclusion Reduction Program* in acute and forensic wards, and *Sensory Modulation* and *Sensory Rooms* had both been implemented in acute wards and PICUs.

The most common setting for implementing interventions to reduce restraint and seclusion was acute wards ($n = 40/150$; 27%). Nevertheless, interventions had also been implemented on PICUs ($n = 11$), and on forensic ($n = 10$), secure ($n = 8$) and specialist geriatric ($n = 6$) wards. The least common settings were admission wards ($n = 1$) and high-dependency units (HDUs) ($n = 1$).

Geographical setting

Just five interventions (3%) had been implemented in different countries, with *Six Core Strategies*[23,75,133] having the widest geographical spread covering six countries (i.e. Canada, England, Finland, New Zealand, Spain and the USA). *No Force First*[24,134] had been applied in three countries (i.e. Australia, England and the USA), as had *Sensory Modulation*[135–137] (Australia, Denmark and New Zealand) and *Sensory Rooms*[138] (Australia, England and the USA). The *Brøset Violence Checklist*[114] (Canada and Switzerland) and *Patient Focused Nursing*[104,139] (Australia and the USA) had each been applied in two countries. *Safewards*[16] was

TABLE 3 Comprehensiveness of reporting

	WIDER recommendation								
	Detailed description of interventions						Assumed change process and design principles		Access to manuals/protocols
Reported ($N = 221$)	By whom delivered	Recipient	Setting	Mode of delivery in implementation	Dose: intensity and duration	Modification and fidelity	Aims/targets	Development	Materials
Not applicable, *n* (%)	17 (8)	21 (9)	32 (15)	42 (19)	29 (13)	16 (7)	–	18 (8)	85 (39)
Not reported, *n* (%)	99 (45)	19 (9)	27 (12)	49 (22)	130 (59)	173 (78)	46 (21)	138 (63)	84 (38)
Reported (including partial reporting), *n* (%)	105 (47)	181 (82)	162 (73)	130 (59)	62 (28)	32 (15)	175 (79)	65 (29)	52 (23)

applied in three countries (Australia, Denmark and England). Overall, the countries applying the widest range of interventions were the USA ($n = 60$) and the UK ($n = 59$). The origins of two interventions were not reported (see *Appendix 10*).

Assumed change process and design principles

Intervention aims and targets

Three intervention aims were identified to (1) reduce, eliminate or prevent, (2) improve and (3) manage or monitor.

One hundred and five of the 150 interventions (60%) had a single aim, 35 (23%) had two aims and five (3%) had three aims[88,131,133,140–142] (*Table 4*). The remaining 14% did not report an aim or target.[77]

TABLE 4 Intervention targets

Target	Standalone intervention	Intervention family	Total, *n* (%)
Multiple restrictive practices			
Seclusion and restraint	31	22	53 (24)
PRN and security involved in restraint	1	–	1 (0.25)
PRN and restraint	–	1	1 (0.25)
PRN, seclusion and restraint	–	3	3 (1)
Single restrictive practices			
Restraint only	15	10	25 (11)
Seclusion/long-term segregation only	7	14	21 (9.5)
Chemical only	4	2	6 (2)
Generic	8	21	29 (13)
Patient focused			
Aggression/violence/assault	14	12	26 (11)
Patient care/outcomes	4	4	8 (3)
Early identification	1	2	3 (1)
Patient experience	3	3	6 (2)
Ward focused			
Safety	3	15	18 (8)
Quality	6	5	11 (5)
Collaboration/communication	–	4	4 (2)
Staff focused			
Knowledge and skills	12	2	14 (6)
Staff outcomes	3	–	3 (1)

PRN, pro re nata.

As seen in *Table 4*, 81 interventions reported a single target, 29 had multiple targets and the remainder did not report a target. The most common target was seclusion and restraint ($n = 53$ interventions), followed by restraint only (mechanical, physical or prone restraint) ($n = 25$ interventions), seclusion [including long-term segregation ($n = 21$ interventions)] and generic terms [e.g. 'restrictive practice', 'conflict and containment', 'coercive measure' ($n = 29$ interventions)]. Another common target was service user behaviour [e.g. aggression, violence, 'problem behaviour' ($n = 26$)]. Just 11 interventions included pro re nata (PRN) medication or chemical restraint as a target: in six it was the sole target. One of these interventions specified eliminating unsupervised PRN medication (and reducing PRN medication overall),[143] another aimed to replace PRN medication with 'other clinical strategies' (no further explanation provided),[131] and another to reduce restraint associated with PRN medication and security involvement.[69] None of the interventions explicitly reported targeting the use of rapid tranquillisation, although Beckett *et al.*[130] referred to reviewing its use (in their procedures) and Sarkar[78] examined the impact of their intervention on their use of rapid tranquillisation (reported in their outcome measures). Some interventions specified the type of restrictive practice they wanted to address, whereas others specified frequency[115,131,144] or duration.[115,145,146]

The most common aim for improvement was quality (e.g. environment, ward functioning, staff presence, service user to staff ratios, quality of care, 'communication') ($n = 11$). Other common targets for improvement included safety ($n = 18$), service user behaviour ('dangerous', 'disruptive', 'risk', 'challenging', 'problem', 'aggression') ($n = 26$),[20,78,112–114,118,129,136,137,141,147–156] and staff skills and attitudes ($n = 14$). Three interventions targeted staff injury,[129,157] anxiety[141] and burnout,[70] whereas 14 targeted service user outcomes and experiences, including service user harm,[114] the service user experience (e.g. feeling of safety[158]), experience of care[79,159] and service user outcomes.[160] Others targeting harm or safety did not specify service user or staff (e.g. Bell and Gallagher[161]) or included both (e.g. Lo[74]). In addition to those targeting quality of care (and implicitly targeting staff behaviour), five specifically targeted staff behaviour in terms of staff attitudes and perceptions,[162] knowledge and efficacy,[21,141,163] and culture.[132]

Reference to theory

Mention of theory was absent from many interventions. Three interventions referred to having a 'theory of change'[85,153] but provided no further detail about what this was, how it had been developed and how it was tested and refined. Many of the 'quality improvement' interventions used a plan, do, study, act (PDSA) cycle: a mechanism to repeat and adjust interventions until they achieve the desired effect.[12,16,17]

Some interventions[130,137] made explicit cited reference to programme-level theories that had informed their intervention procedures, such as *Sensory Modulation* or *Trauma-Informed Care*. Other programme-level theories cited sought to explain staff behaviour, service user behaviour, therapeutic relationships and organisational change. These studies often sought to test or modify not the actual theory but rather the impact of using interventions based on them in relation to the reduction of restrictive practices.

The most frequently cited theory related to staff behaviour was social learning theory,[71–73,152,164] which was used to support training interventions that sought to improve the self-efficacy of individual staff and staff teams.

Bonner's theoretical model for debriefing and post-incident review[165] informed one intervention[166] and the general aggression model[167] informed another that sought to reduce aggression via *Sensory Modulation*.[152] Kernberg's theory of personality organisations and transference-focused psychotherapy[168,169] informed clinical guidelines that aimed to reduce restraint.[170] Other theories mentioned included those seeking to explain care giving processes: Peplau's interpersonal relations[171] and Watson's caring theory.[172] Both *Safewards*[173] and *City Nurse*[102] were based on the theoretical work of Bowers *et al.*[101] regarding conflict and containment, and the interaction between service users and staff.

Five interventions were informed by broad organisational change theories. Kanter's structural empowerment theory sees organisational empowerment and potential for change as being influenced by the individuals within the organisation having access to information, resources and opportunities to learn.[174] The transtheoretical model of change[175] is generally applied to individuals, explaining how people prepare for and enact change, although Colton[176] applies it to organisations to structure a tool kit to prepare to reduce restrictive practices. Schein's model of organisational culture[177] informed the development of the *Six Core Strategies*.[178] This focuses on publicly espoused values and assumptions. Senge[179] focuses on the capacity of organisations and, by extension, the individuals within them to learn and focuses on a common goal.[133] The Iowa Model of Evidence Based Practice was used to guide the implementation of a rapid response team.[74] The full analysis of behaviour change techniques used in the interventions can be found in *Chapter 5*.

Mode of delivery: intervention procedures

The extraction process highlighted the procedures used by each intervention to address restrictive practices. A total of 15 unique procedures were identified from the analyses and these were organised into six themes (*Figure 4*).

Staff-focused procedures

Staff-focused procedures were those that were aimed at and undertaken solely by staff with a view to influencing staff use of restrictive practices. One procedure was training, which could cover, among other topics, de-escalation (e.g. Laker *et al.*,[21] Sullivan *et al.*,[104] Lee *et al.*[127] and Jonikas *et al.*[180]) or crisis management (e.g. Steinert *et al.*[20] and Melin[69]). Another staff-focused procedure was role modelling, which could involve supervision or mentoring (e.g. Fletcher *et al.*[181] and Noorthoorn *et al.*[182]) and identifying champions, experts or specialists (e.g. Bowers *et al.*,[102] Tully *et al.*[90] and Lombardo *et al.*[159]) to set an example to ward staff.

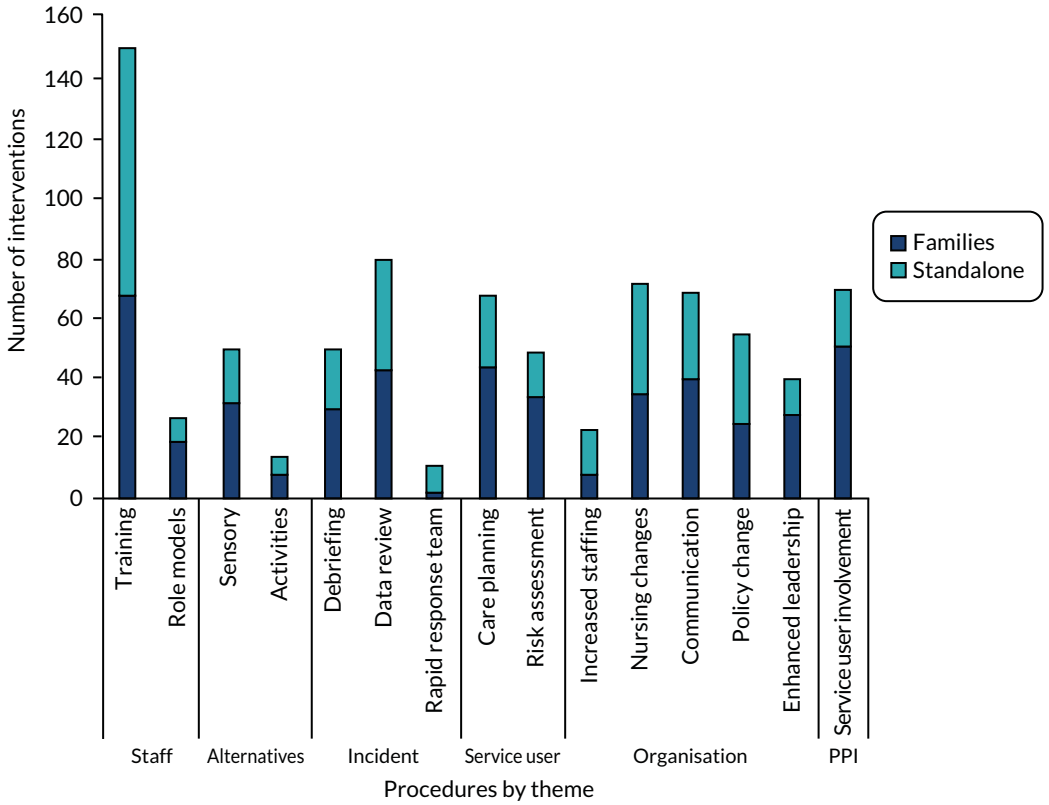

FIGURE 4 Intervention procedures by theme. PPI, patient and public involvement.

Service user-focused procedures

Service user-focused procedures were those that focused on and sometimes involved service users but always involved staff. One of these procedures was risk assessment – whereby service users' triggers would be recorded – which was often undertaken using a tool designed for this purpose (e.g. *Brøset Violence Checklist*[114] or the *Early Detection Plan*[118]). Another related procedure was care planning, in which service users and/or staff planned appropriate and preferred strategies to prevent or respond to distress and/or incidents. These sometimes involved service users in identifying their own triggers and forming their own plans, for example a 'personal safety plan'[132] and also included PDSA.[161]

Alternative approaches

Two further procedures were classified as alternative approaches because they proposed alternative ways of either preventing or responding to service users' distress. Sensory approaches included *Sensory Modulation* via the installation of sensory or *Comfort Rooms* (e.g. Novak *et al.*,[183] Barton *et al.*[184]) and/or the availability of sensory equipment (e.g. Lee *et al.*[127]) and/or use of *Sensory Modulation* techniques (e.g. Yakov *et al.*[185]).

Incident-focused procedures

Other procedures were incident focused, that is, they were responses to incidents of restrictive practices. These included incident review procedures, in which organisations (staff and managers) conducted retrospective chart audits (e.g. Qurashi *et al.*[186]) or collected and monitored their incident data (e.g. Donat[106] and Friedman *et al.*[131]) to establish baseline and progress rates, or to identify patterns for targeted intervention. In contrast to this whole-system review, debriefing was conducted immediately or soon after an incident, and included the staff and service users involved and possibly others who witnessed the incident (e.g. Duxbury *et al.*[120]). The final procedure was rapid response, where specially trained rapid response teams were formed to respond to and provide support to incidents when they happened [e.g. psychiatric emergency response teams (PERTs); see Smith *et al.*[142] and Prescott *et al.*[128]].

Organisation-focused procedures

We also identified several organisation-focused procedures. These were system-wide structural and cultural changes including making changes to staffing levels (e.g. Parasurum *et al.*[77]), increased one-to-one nursing (e.g. Jungfer *et al.*[109]) and/or staff availability to/contact with service users (e.g. Beezhold *et al.*[79] and Lewis *et al.*[132]). Another procedure involved changing nursing approaches [e.g. such as implementing the *City Nurse* model,[101] the Bergen model,[129] a recovery approach (e.g. Repique *et al.*[187]) or a trauma-informed approach (e.g. Madan *et al.*[108])]. This theme also included improvements to communication (e.g. Stead *et al.*[188]), community meetings (e.g. Mistral *et al.*[189]), de-escalation (e.g. Cowin *et al.*[163]) and safety huddles (e.g. Taylor-Watt *et al.*[153] and Stead *et al.*[188]). Another procedure involved policy change (e.g. Short *et al.*[157] and Sullivan *et al.*[190]). Finally, leadership-related procedures involved senior management being involved in meetings, making statements of commitment.

Service user involvement in interventions

Forty-eight interventions involved service users in some way, but the type and extent of involvement varied greatly. In some cases, service users were involved in multiple ways, whereas in others they had limited roles. A number of interventions involved service users in a consultation or advisory role, for example as committee representatives,[133] participants of project teams[158] (e.g. working group on medicines and rapid tranquilisation[130]), service user panels,[160] or advisory committees.[88,115,140,163] Service users were consulted for their views[16] and feedback on rules,[116] sensory rooms[116,140] and research.[17,140] Others described involving service users in the design or co-production of parts of the intervention, such as safety plans,[116] information leaflets,[130] comfort rooms,[23,191] training[16,115,163] and the selection of intervention components.[16,116] Service users were involved in intervention delivery, for example in ward/community meetings,[17,23,186,191] delivering activities,[116] and training,[88,116,137,163,182,192,193] displaying their positive messages for current service users,[181,192,194,195] and as peer advocates,[142] counsellors[196] and support workers.[99,193] Only two interventions specified that service users were paid for their involvement.[24,197] The remainder that reported service user involvement provided no further detail.

Seventy-one per cent ($n = 158$) of interventions involved multiple procedures, which ranged from 2 to 10 procedures (*Figure 5*).

The most common procedures were training/education ($n = 151$), changes to nursing approaches ($n = 72$) (e.g. implementing *Trauma-Informed Care* or the *Recovery Approach*) and reviewing incident data ($n = 80$). Least mentioned were rapid response teams ($n = 11$) and activities ($n = 14$) (see *Appendix 11*).

As illustrated in *Figure 6*, although most interventions involved staff training, few reported the content, mode of delivery or training provider in any detail. The documentation reporting 89 interventions did not report any detail at all. The most common mode of delivery was group training or workshops ($n = 37$). Six reported using e-learning or online training and a further five reported multimedia components (e.g. video, PowerPoint) to their training. Four interventions reported using a train-the-trainer model. Others described training as one to one ($n = 2$), face to face ($n = 3$) or on the job ($n = 1$). Two interventions mentioned using champions and exchange visits respectively. Training was specified as provided in-house in 64 interventions and, of these, only seven specified the provider (these included quality improvement team, occupational therapists, unit manager or researcher). Training was delivered by external providers in 24 interventions, and 20 of these specified the provider. Providers mentioned included Bergen Model Representatives, Centre for Creative Leadership, *City Nurse*, Crisis Prevention Institute (CPI), ePsychNurse,

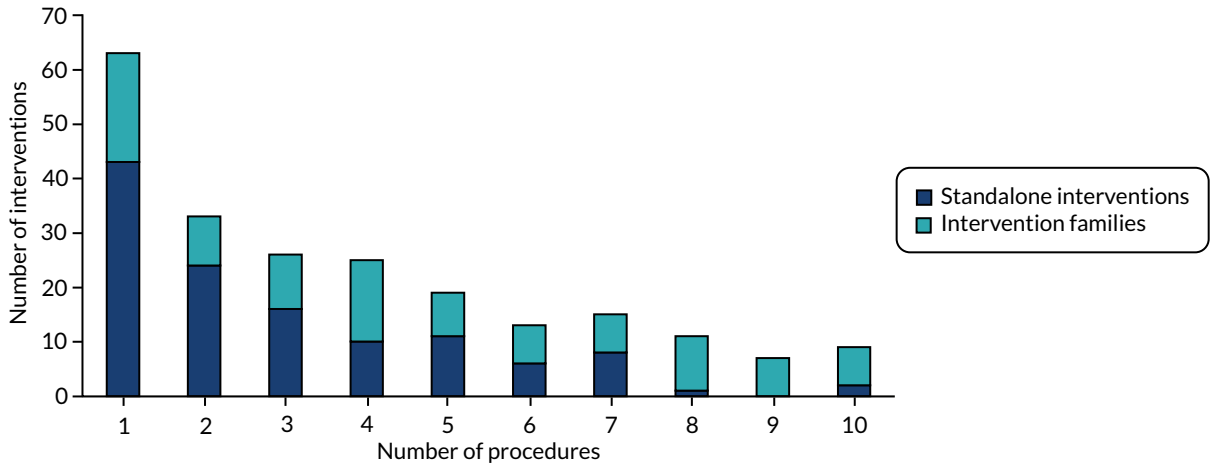

FIGURE 5 Number of procedures per intervention.

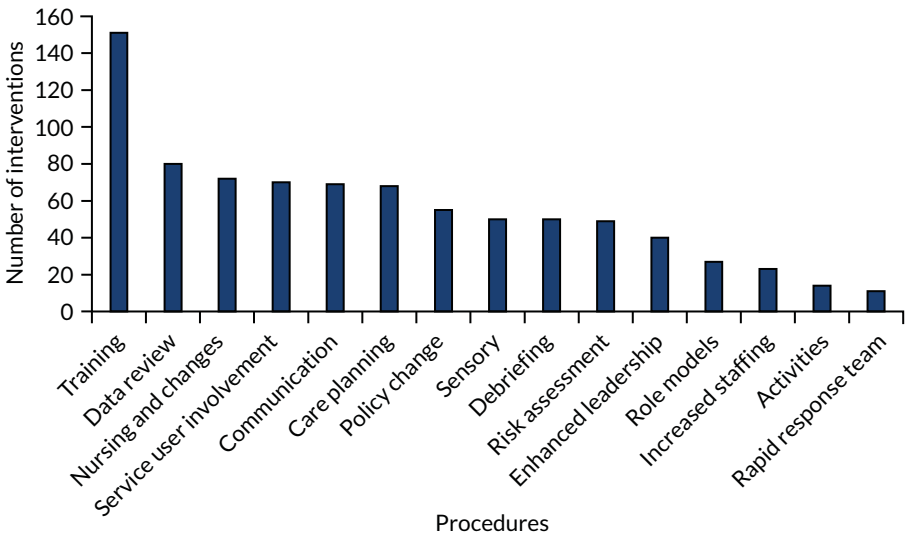

FIGURE 6 Distribution of procedures.

Omega, *Safewards*, Substance Abuse and Mental Health Services Administration (SAMSHA), National Enforcement Training Institute, JKM Training, AQUA and Recovery Innovations. The remaining interventions did not report any information about the training provider.

Intervention dose: duration and intensity

Many evaluations did not report details about the duration and intensity of the intervention. Partial details, such as overall duration of the intervention or of an individual component (usually training), were sometimes, but not always, provided. Often, the evaluation period and the duration of intervention implementation were not distinguishable. Similarly, the duration of individual intervention components was often not reported. With this proviso, interventions ranged in length from 10 months to 5 years. Some interventions described providing standalone training sessions, whereas others were conducted over a short period of time (e.g. 1 week) or longer (e.g. several months). One evaluation described offering refresher sessions.[152]

Intervention materials

Interventions reported using various materials in the implementation of the intervention, including training materials, guidelines, multimedia resources, tools, posters, slides and policies. Some referred to materials that are publicly available on the internet (i.e. the *Six Core Strategies*, *Safewards*, *Brøset Violence Checklist*).

Costs and funding

Eighteen interventions referred to the cost of implementing the intervention or its financial impact. Costs were reported in the currency relevant to the study setting. Several studies provided details of the costs of one or more elements of the intervention, for example: US$10,000 for a Snoezelen room,[198] US$11,456.98 for two *Sensory Rooms*,[191] US$4000–5000 for sensory equipment,[136,198] £70,000[189] and £2000[154] for environmental improvements, US$600 for PERT including office supplies and digital pagers,[74] £69,285.25 for staff de-escalation and restraint training including replacement costs and overheads[21] and US$20,000 for consulting fees.[198] Others referred to costs incurred but did not specify the amount, for example sensory equipment;[127,196] camera, television monitor, three two-way radios;[149] or staff training.[23,196] Putkonen *et al.*[17] reported the costs of their intervention as the equivalent to two person-years per year. Bell and Gallacher[161] stated that their interventions incurred no costs.

Seven interventions reported who funded the intervention. Three reported receiving funding from the hospital where the intervention was implemented,[23,74,127] whereas Mistral *et al.*[189] received funding from the mental health care trust. Putkonen *et al.*[17] specified that funding came via the hospital performance improvement project from research funding from the National Institutes of Health and Welfare. McEvedy *et al.*[137] reported receiving funding from the Victorian state government-funded programme. Lloyd *et al.*[136] reported that they received funding but did not specify the funder.

Nine interventions reported some cost–benefit analysis. Mistral *et al.*[189] reported a 62% reduction in time lost to staff short-term illness. Laker *et al.*[21] recommended further analysis, having been unable to draw conclusions from insufficient data regarding the costs of incidents, specifically damage to property, staff or service users and injury-related absence. Brown *et al.*[154] reported savings of 49% associated with reduced staff absence and injury (from £119,988 prior to implementation to £61,376 post implementation). Short *et al.*[157] reported a decrease of 77% in lost work days due to staff injury (90% of which were attributable to physical interventions). Lo[74] argued that because the PERT intervention did not require any additional staffing resources it was likely to bring economic benefits. Finally, Putkonen *et al.*[17] reported 75% reduction in the number of sick days in the information period and 65% reduction in the intervention period, compared with the previous year; and in addition, reported 80–82% shorter duration of sick days.

Evaluations of interventions

Evaluations were identified using the screening questions of the MMAT: the presence of a research question and the collection of data required to answer that question. Those reports that passed the screening were then appraised using the MMAT to be given a score in the form of a percentage.

Of the 109 evaluations that we identified, 106 were research reports and there was one intervention report,[92] one service report[156] and one practice example.[159] Six theses and five abstracts were included. Most evaluations ($n = 95$) were published in 42 peer-reviewed journals spanning mental health, nursing, psychiatry and quality. The most common publication titles were *Psychiatric Services* ($n = 12$), *Journal of Psychiatric and Mental Health Nursing* ($n = 7$), *Journal of Psychosocial Nursing and Mental Health Services* ($n = 5$), *International Journal of Mental Health Nursing* ($n = 6$) and *Psychiatric Quarterly* ($n = 7$). The remaining journals featured between one and four records.

Evaluation design

Evaluation design was often not described and, when it was reported, a variety of terms were used. Accordingly, design had to be inferred from other study details in some cases. Most evaluations were non-randomised studies ($n = 103$) (see *Appendix 12*). Based on the MMAT screening questions, all of these evaluations were considered to have recruited participants who were representative of the target population and used suitable outcome measures. Several were not considered to have reported complete outcome data and only two-thirds adequately accounted for confounders. There was very little reporting of modifications and fidelity to the intervention protocol, with only 11% of evaluations reporting this. There were six RCTs, four of which were cluster RCTs (*Table 5*). The MMAT scores of

TABLE 5 Evaluations using a RCT design

Study authors and year of publication	Design	Sample	Intervention	Control	Outcome measures[a]	Findings[a]
Bowers *et al.* 2015[16]	Cluster RCT	16 intervention wards, 15 control (mean number of beds per ward was 19)	*Safewards*	Physical health intervention	Rates of (1) total conflict and (2) total containment (Patient–staff Conflict Checklist)	Rate of conflict reduced by 15% (95% CI 5.7% to 23.7%); rate of containment reduced by 23.2% (95% CI 9.9% to 35.5%; not significant)
Kontio *et al.* 2014[199]	Cluster randomised trial	5 intervention wards, 5 control wards	E-learning course	Treatment as usual	Rates and duration of seclusion and restraint	Duration of mechanical restraint decreased ($p < 0.001$)
Putkonen *et al.* 2013[17]	RCT	2 intervention wards, 2 control wards	*Six Core Strategies*	Treatment as usual	Rates of seclusion, restraints, or room observation, duration of seclusion or restraint	Rates of seclusion, restraints and room observation decreased from 30% to 15% (IRR 0.88, 95% CI 0.86 to 0.90; $p < 0.001$). Duration of seclusion/restraint decreased from 110 to 56 hours per 100 patient-days (IRR 0.85, 95% CI 0.78 to 0.92; $p < 0.001$)

continued

TABLE 5 Evaluations using a RCT design (*continued*)

Study authors and year of publication	Design	Sample	Intervention	Control	Outcome measures[a]	Findings[a]
van de Sande *et al.* 2011[200]	Cluster RCT	Two intervention wards, two control wards	Structured short-term risk assessment (*Brøset Violence Checklist*, Crisis Monitor, Kennedy–Axis V scale, Brief Psychiatric Rating Scale, Dangerousness Scale, Social Dysfunction and Aggression Scale)	Treatment as usual	Rates and duration of seclusion, number of secluded patients	Duration of seclusion decreased ($p < 0.05$)
Parasurum *et al.* 2011[77] (abstract)	RCT	Four intervention wards, four control wards	Nursing staffing level and care	Not reported	Physical restraints	No restrictive practice outcomes reported
Abderhalden *et al.* 2008[113]	Cluster RCT	Four wards randomised to intervention, five wards randomised to control, five wards introduced intervention without randomisation	Structured short-term risk assessment (*Brøset Violence Checklist*) for every patient admission	Treatment as usual	Incidence rates of (1) severe aggressive events (SOAS–R) and (2) coercive measures (yes/no)	Coercive measures decreased by 27% ($p < 0.001$)

CI, confidence interval; IRR, incidence rate ratio; SOAS–R, Staff Observation Aggression Scale – Revised.
a Restrictive practices only.

these six RCTs varied from 0% to 80%. Five out of the six RCTs reported complete outcome data and four did not describe any deviation from the protocol. Only three had comparable groups at baseline and described rigorous randomisation processes. Two reported that outcome assessors were blinded.

Four qualitative studies were identified[72,137,152,201] (*Table 6*), as were a further six that used mixed methods[15,140,166,187,189,203] (*Table 7*). Goulet *et al.*[166] and Chandler[201] reported using case study methodology. These evaluations used the following data collection and analytical methods: interviews,[72,137,140,152,201] focus groups,[15,152,166,187] document (policy) review,[201] observation,[201] thematic analysis[15,72,140,152,187] and qualitative content analysis.[137,166,201] All of these studies evaluated different types of interventions, except McEvedy *et al.*[137] and Sutton *et al.*,[152] which both evaluated *Sensory Modulation*.

The MMAT prompts an appraisal of whether or not qualitative methods are appropriate, whether or not the data collection methods are adequate and the findings and their subsequent interpretation are sufficiently reported, and whether or not the study has overall coherence. The qualitative studies all scored the highest score of 100% when appraised using the MMAT.

The six mixed-method studies all used the same combination of qualitative data and non-randomised quantitative data (see *Table 7*). The qualitative arms of these mixed-method studies scored better than the quantitative arms, but they generally scored lower than the qualitative-only studies. All were considered appropriate subjects for qualitative inquiry with adequate data collection methods to address the research question. Four of the studies appeared to report findings and interpretations

TABLE 6 Characteristics of the qualitative studies

Study authors and year of publication	Design and methods	Research question(s)	Setting and sample	Intervention	Findings
Sutton *et al.* 2013[152]	Qualitative: narrative analysis	*To examine the potential of using sensory-based approaches to develop the theory and practice of preventing, minimizing, and managing aggression in mental health settings*	4 units: 40 staff, 20 patients	*Sensory Modulation* (*Six Core Strategies*)	Identified three factors that contributed to the management of distress and agitation: 1. facilitating a calm state 2. enhancing interpersonal connection 3. supporting self-management
Chandler 2012[201]	Qualitative: case study appreciative inquiry approach,[202] inductive content analysis	*How has the unit decreased use of restraints and seclusion?*	20-bed unit: 11 staff	*Six Core Strategies*; TIC	Rates of seclusion and restraint decreased from 27 to 6; identified three factors that played a key role: 1. leadership as empowering staff, which, in turn, facilitates staff empowerment of patients 2. staff and patient learning about trauma 3. staff knowledge of individual patient's response to stress and staff response to patient stress
Huckshorn 2012[72]	Qualitative: phenomenology	*To explore and describe the experiences of leaders and staff who directed or participated in successfully reducing the use of seclusion and restraint*	2 units: 21 staff	*Six Core Strategies*	Identified key factors for change: • Leadership role in changing the values, beliefs and practices • Leaders training and role modelling • Credible training • Routine monitoring, reporting and posting of data • Ongoing supervision, constant communication and time • The use of a performance improvement approach
McEvedy *et al.* 2012[137]	Qualitative: descriptive	*To report descriptions of the effectiveness of the train-the-trainer intervention*	19 mental health services: 22 staff interviews; 10 focus group participants	*Sensory Modulation*; TIC	Knowledge of *Sensory Modulation* and TIC was transferred to 'a substantial number' of mental health service staff – but the impact on practice is not evidenced

TIC, *Trauma-Informed Care.*

TABLE 7 Mixed-method studies

Study authors and year of publication	Design and methods	Research question(s)	Setting and sample	Intervention	Findings
Mistral *et al.* 2002[189]	Mixed methods	*To evaluate the effectiveness of the Interventions*	One unit: 36 staff	Therapeutic community	Use of seclusion decreased; identified improvement in staff attitudes and ward atmosphere
Newman *et al.* 2018[203]	Mixed methods	*To evaluate the effects of a 90-minute TIC-based staff training*	18-bed unit: 88 staff	Staff training: TIC	Rates of seclusion decreased; identified four types of facilitators/ barriers: 1. staff attitudes/ emotions 2. staff skills 3. staff actions 4. unit environment
Cabral and Carthy 2017[15]	Mixed methods	*To provide a service evaluation of the Safewards implementation*	Six wards: 102 staff; 89 patients	*Safewards*	Increase in EssenCES score; identified three main themes: 1. clear benefits from *Safewards* implementation 2. resistance to the initiative 3. knowledge and skills deficit of the model
Goulet *et al.* 2017[166]	Mixed methods	*To develop and evaluate a 'post-seclusion and/or restraint review (PSRR) intervention*	One unit: 12 staff, three patients	Post-incident review	Statistically significant reduction in rate ($\chi^2 = 4.473$; $p = 0.046$) and duration ($U = 4.181$, $z = -2.175$; $p = 0.030$) of seclusion but not restraint
Repique *et al.* 2016[187]	Mixed methods	To reduce the use of restraints; assess staff knowledge, beliefs, perceptions and values; and evaluate the implementation process	One hospital: 42 pre intervention, 32 post intervention, two focus groups of four staff	Recovery-oriented nursing practice	Slight reduction in restraint rates; identified that staff thought training could be improved; would like feedback from patients and leadership involvement
Smith and Jones 2014[140]	Mixed methods	*To explore the impact of the introduction of a sensory room*	15-bed unit: 10 staff, seven patients	*Sensory Rooms*	No significant reduction in seclusion rates, despite staff perception of reduction

EssenCES, Essen Climate Evaluation Schema; TIC, *Trauma-Informed Care.*

both derived from and supported by the data, as well as having a coherence across the study. Two were unclear on this aspect. The quantitative data collection in each was considered representative of the target population and to be using an appropriate outcome measurement. It was unclear whether or not two of the six studies reported all outcomes, and three did not account for confounding variables in the analysis. Only one study reported fidelity in terms of intervention delivery. The integration of the mixed methods was generally weak. Although there was adequate rationale for using the approach in all but one study, only one study integrated outputs and only one (other) study addressed divergences between the qualitative and quantitative findings. The different arms were considered to adhere to quality criteria in only half of the six studies.

Just two evaluations had a participatory element (c.f. involvement in the intervention); Goulet *et al.*[166] involved a service user/partner researcher and Bowers *et al.*[102] described their study as incorporating elements of action research.

Outcome measures in evaluations

Seventy evaluations reported multiple outcome measures (range 2–7 outcome measures) and 37 reported a single measure (*Figure 7* and see *Appendix 13*). The most common measures were the incidence of seclusion ($n = 56$) and restraint ($n = 48$), followed by, less often, the use of PRN medication and forced medication ($n = 16$). Others included the incidence of violence or other 'challenging' behaviour ($n = 20$), self-harm and suicidal gestures ($n = 4$), staff or service user injury ($n = 6$) and staff sickness or absence ($n = 4$). Twenty-three reported measuring the incidence of a generic term for restrictive practices. In 11 cases, they reported the number or percentage of service users. Evaluations also reported measuring the duration of seclusion ($n = 22$) and restraint ($n = 16$), with one reporting duration per service user. Thirty-three evaluations reported the time elapsed between incidents, number of incidents averted, staff and service user experiences, and staff knowledge.

Several interventions used existing, routinely collected data for their evaluations, such as archived data, incident reports, nursing log-books, charts, institutional databases and electronic records. Five evaluations developed measures for the purposes of their evaluation: Alfred Psychiatry Safety Tool;[127] Crisis Monitor;[200] Patient Safety Climate Tool;[161] Staff Observation Aggression Scale (SOAS);[112] and Staff Observation Aggression Scale – Revised (SOAS-R).[118] Others developed or adapted surveys, created log-books or databases, or designed qualitative tools or visual analogue scales to collect data. We identified 40 standardised measures used 54 times in total. Thirty of these had been used just once and five had been used twice. The Heyman Staff Attitudes towards Seclusion Survey[204] and the Patient–Staff Conflict Checklist Shift Report (PCC-SR)[205] had both been used three times each, and the *Brøset Violence Checklist*[206] and the Essen Climate Evaluation Schema (EssenCES)[207] had both been used four times each.

Evaluation findings

The very wide variation in the 109 interventions described above presented considerable challenges for assessment of intervention effectiveness. The finding that most of the studies reported some positive outcomes in relation to reducing restrictive practices may be related to publication bias,

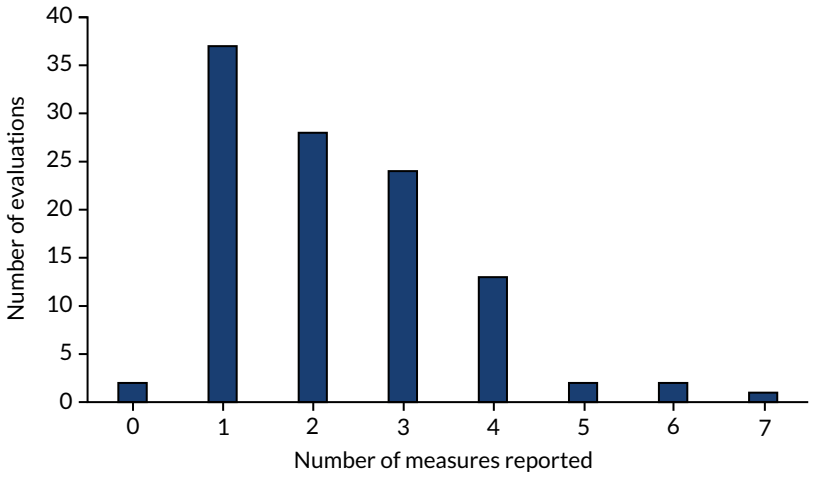

FIGURE 7 Number of outcome measures.

especially in the grey literature. Many of the studies that reported evaluations contained anecdotal findings (i.e. did not present full figures), and these were excluded from this assessment. One hundred and seven evaluations were published in journals or via academic conferences, and these were examined in more detail. Twenty-six reported no positive findings related to the reduction of restrictive practices, and the majority of these evaluations used more than one procedure (e.g. training, audit, policy changes). As these procedure categories are broad, there is little to be learned from relating positive or negative outcomes back to their use. Interventions using a single procedure may be more useful in determining what type of procedures might reduce the use of restrictive practices. There were 13 of these: five used staff training (four reporting positive findings and one negative) and two used sensory methods (one positive finding and the other negative), but the remainder used a variety of strategies and all reported positive findings.

At least one positive finding in relation to reducing restrictive practices was reported in 51 of the evaluations; however, 32 did not report statistical significance. One evaluation[77] (reported in a conference abstract) did not report findings.

Controlled trials

There were 18 evaluation studies that used a control for comparison purposes (see *Appendix 12*) and six RCTs (see *Table 5*). Fifteen reported significant findings in relation to the decrease in use of a restrictive practice. However, they did not all use the same definition for the restrictive practices, with two studies combining all restrictive practices.[16,113] Only one study reported an increase in restrictive practices but this was confounded by major service changes during the intervention. Of those studies that reported decreased use of restrictive practices, eight reported restraint, eight measured seclusion, two measured PRN medication and two measured observation.

Qualitative studies

Cabral and Carthy[15] examined the staff experience of implementation of *Safewards*, including its perceived benefits and challenges. They reported that staff perceived benefits, but there was some resistance, and they also identified a knowledge and skills deficit of the model. McEvedy *et al.*[137] explored services' feedback on the effectiveness of a train-the-trainer intervention on knowledge transfer and translation of this knowledge into practice. They reported that knowledge transfer to staff was achieved, with most services subsequently training further staff (in some cases adapting the train-the-trainer materials). However, they found little evidence of translation of *Sensory Modulation* or *Trauma-Informed Care* into practice. Goulet *et al.*[166] examined the staff and service users' perspectives of the impact of the intervention, including barriers to and facilitators of its implementation. Staff reported that the post-incident review gave them the opportunity to discuss the service users' feelings and restore the therapeutic relationship, while staff were able to learn from the experience. Smith and Jones[140] explored staff and service users' experiences of using the sensory room, reporting that they considered it to be a positive contribution to the unit, that it had been incorporated into care plans and improved communication. Staff perceived that there had been a reduction in the use of seclusion but it is unclear whether or not service users were asked. Repique *et al.*[187] explored nurses' views of *Recovery-Based Principles* training and reported that they perceived the training materials to be good but lacking specific detail and examples, and stated a preference for a live presenter with the opportunity to ask questions. Nurses also expressed a desire for more direction from leadership and service user feedback.

Chandler[201] reported that seclusion and restraint were reduced 'dramatically' (although this is not quantified) and explored how the unit achieved this reduction and promoted safety. The author described how opportunities, information, support, resources and relationships were the factors that gave staff the leadership to feel empowered and, in turn, they empowered service users. These factors were key to reducing restrictive practices and promoting safety. For example, staff were able to learn about the impact of trauma, service users' sensorimotor needs and stress responses, and the establishment of respectful and trusting relationships. Staff were also able to reflect on their responses to service user stress.

Interventions subject to multiple evaluations

Two follow-up studies ($n = 2$), one pilot plus main study ($n = 1$) and two replication studies ($n = 2$) were identified.

Modification of and fidelity to intervention protocols

Eleven evaluations ($n = 11$) reported whether they tailored or modified the intervention protocol. Two described using some but not all of the *Six Core Strategies*[90,144] and three reported modifying a tool.[113,188,208] Others reported tailoring the intervention to meet service users' needs,[140] making modifications as the intervention proceeded[106] and allowing wards to choose the intervention.[209] One evaluation reported that modification was not planned but may have occurred unintentionally.[102]

Twelve evaluations reported fidelity. The earliest of these was published in 2010 and the subsequent period saw fidelity reported with an increasing degree of precision. Two publications from 2010 made brief reference to fidelity; Lee *et al.*[127] reported that their Alfred Psychiatry Safety Tool had been completed by 50% of staff and that 81% of staff had read a completed tool, and Fluttert *et al.*[118] reported that their protocol achieved 'uniform application' and attributed this to it being structured and implemented during existing weekly meetings. Godfrey *et al.*[210] reported consideration of how to maintain fidelity (they implemented a team with advanced training to respond to incidents) but did not report or estimate fidelity rates.

Two interventions were identified that included the development of a tool to record and measure fidelity: one developed in the USA to assess fidelity to the *Six Core Strategies* [the 38-item Inventory of Seclusion and Restraint Reduction Interventions (ISRRI)],[211] and the other developed in the UK to assess fidelity to *Safewards* (*Safewards Researcher Visit Fidelity Checklist*).[16] Wieman *et al.*[211] reported that fidelity to the *Six Core Strategies* (measured using a prototype of the ISRRI) fluctuated over time and across 43 settings, and recommended further research to understand the relationship between setting characteristics, fidelity patterns and outcomes.

In addition to the original *Safewards* study,[16] four further interventions reporting fidelity utilised the *Safewards* protocol and *Researcher Visit Fidelity Checklist*.[15,181,194] Using this checklist, Bowers *et al.*[16] reported a mean fidelity rate of 38% [standard deviation (SD) 8%, range 27–54%, $n = 271$] during the outcome period. Bowers *et al.*[16] also assessed fidelity using a questionnaire, which identified a mean fidelity rate of 89% (SD 11%, range 62–100%, $n = 79$). Price *et al.*[194] reported a mean fidelity rate of 27.28% across the six wards in which the intervention was implemented. Cabral and Carthy[15] were less precise, stating simply that 'most of the 10 interventions had either been implemented or initiated across all six participating wards'. Fletcher *et al.*[181] modified the *Researcher Visit Fidelity Checklist* and measured fidelity over a 12-month period to assess 'dose effects' and reported 'consistent improvement', with services delivering an average of four interventions at the first time point and nine by the last. Maguire *et al.*[197] used Fletcher *et al.*'s[181] adapted checklist and reported a mean fidelity rate of 94.75%.

Bell and Gallacher[161] reported an increased use of debriefing from 22% in the 6 months prior to the intervention to 60% in the final 6 months. Mann-Poll *et al.*[209] attributed 'high levels of engagement' to giving wards choices about participation in their intervention, but conceded that 'We cannot be certain if the individual respondents working on participating wards were also actively participating in the [Seclusion Reduction Program]'.

Chapter 5 Results of the behaviour change technique synthesis

This chapter addresses objective 2 in describing the presence and frequency of BCTs in interventions.

Individual behaviour change techniques identified in interventions

As discussed, and illustrated in *Figures 1* and *2*, the result of the search strategy was a data set of 175 records, which, on analysis, was found to report a total of 150 different interventions. The 150 interventions were coded for BCT content. Description of intervention content was frequently found in the methods sections of studies, but additional detail was occasionally provided in the results or discussion sections. The heterogeneity of documents meant that the studies identified in the grey literature often did not report the intervention in a structured way, meaning that full texts had to be searched for content related to BCTs.

When interventions were examined by target, type of study or reported findings, it was apparent that there was a small group of BCTs that were most frequently found across all the interventions, that is 'instruction on how to perform the behaviour', 'restructuring social environment', 'problem-solving' and 'action-planning'. Overall, 43 of the possible 93 BCTs within the BCT taxonomy were identified in the interventions (46%). The range of BCTs identified per intervention was 1–33 (mean 8 BCTs). BCTs found at least once across the interventions are shown in *Figure 8* in terms of the percentage of interventions in which they were identified. For example, BCT 4.1, 'instruction on how to perform the behaviour', was detected in 91% of interventions, whereas BCT 10.10, 'reward (outcome) of the behaviour, was detected in only 1% of interventions.

Further description of BCTs that featured in > 20% of interventions is provided in *Table 8*. This shows the most frequently identified BCTs, that is, those featuring in > 20% of interventions, together with an example of how the BCT was applied. For reference, the full BCT taxonomy as used in this study can be found in *Appendix 6*.

Behaviour change technique clusters identified in interventions

The 43 different BCTs identified in the interventions were contained by 14 out of a possible 19 clusters within the BCT taxonomy. These are shown in *Figure 9*. The first four clusters contained over two-thirds of the BCTs; these were cluster 1 'goals and planning', cluster 4 'shaping knowledge', cluster 12 'antecedents' and cluster 2 'feedback and monitoring'. The 14 clusters, the content that was coded to BCTs within them and those BCTs that were not identified are described below.

Goals and planning

Behaviour change techniques in the cluster 'goals and planning' were those identified most commonly in the interventions, with just over one-fifth (22%) of identified BCTs contained within this cluster (*Figure 10*). All the BCTs in this cluster were identified: 'discrepancy between current behaviour and goal' (BCT 1.6), 'behavioural contract' (BCT 1.8), 'review for behaviour' (BCT 1.5), 'commitment' (BCT 1.9), 'review for outcomes' (BCT 1.5), 'goal-setting (behaviour)' (BCT 1.1), 'goal-setting (outcome)' (BCT 1.3), 'action-planning' (BCT 1.4) and 'problem-solving' (BCT 1.2).

Problem-solving refers to when the individual or team is prompted to analyse what is influencing behaviour (unsuccessful de-escalation resulting in increased restrictive practice) and find solutions that

FIGURE 8 Behaviour change techniques identified across all interventions.

attempt to overcome the problems or increase the likelihood of it happening. The 'problem-solving' described by interventions occurred in response to a problem of high rates of restrictive practices, or the resulting staff or service user injury. These problems could be identified at different levels: regional level, leading to a change in policy, within a service or in the review of individual service users. These reviews might involve the service user in the problem-solving process by taking place during individual care-planning meetings, debriefing after incidents or communal service user meetings. Problem-solving not involving service users took place during nursing handovers (e.g. McEwan *et al.*[123]), staff clinical supervision (e.g. Prescott *et al.*[128]) and in response to routine data review:

> *In weekly clinical supervision sessions, relevant data on seclusions and the circumstances leading up to its use were systematically discussed, in order to find ways to prevent future occurrence.*
>
> *Mann-Poll* et al.[212]

TABLE 8 Description of commonly identified BCTs

BCT	Example	%	*n*
4.1 Instruction on how to perform the behaviour	Receive tuition about how to perform effective de-escalation (e.g. as part of a staff training course)	91	136
1.2 Problem-solving	Person/team is prompted to analyse factors influencing the behaviour (unsuccessful de-escalation resulting in increased restrictive practice) and find solutions or strategies to overcome the problems or increase facilitators (e.g. people become frustrated because of boredom, funding sought to provide ward activities)	73	110
12.2 Restructuring the social environment	Making changes to the social environment that increase the potential for de-escalation (e.g. promote social contact between service users and staff by organising communal meals)	70	105
1.4 Action-planning	Planning of how de-escalation will be carried out at either an individual level based on people's preferences or on a more general level (e.g. when a service user is distressed, they inform staff in advance that they would prefer to be allowed time off the ward)	55	82
13.2 Framing/reframing perspective on performing the behaviour	Suggesting the deliberate adoption of a (new) perspective on behaviour in order to change cognitions or emotions about performing the behaviour (e.g. seeing aggression as a manifestation of trauma and distress)	47	70
4.2 Information about antecedents	Provide information about antecedents that reliably predict requirement of the behaviour (e.g. discussions about what often happens prior to an incident where restrictive practices are used)	40	60
7.1 Prompts or cues	Introduce a stimulus with the purpose of prompting the behaviour (e.g. introducing a new risk assessment on admission)	39	58
2.7 Feedback on outcome(s) of behaviour	Monitor and provide feedback on the outcome of performance of the behaviour (e.g. the number of restraints that have occurred on a ward)	36	54
3.2 Social support (practical)	Advise on, arrange, or provide practical help (e.g. de-escalation rapid response team can be called to provide practical help to prevent an incident escalating)	29	43
12.5 Adding objects to the environment	Add objects to the environment in order to facilitate performance of the behaviour (e.g. introducing a sensory box with equipment that could help staff to assist service users to manage distress)	28	42
13.1 Identification of self as role model	Be aware that one's own behaviour may be an example to others (e.g. staff attending training encouraged to promote de-escalation in their everyday practice)	28	42
2.4 Self-monitoring of outcome(s) of behaviour	Establish a method for the person/team to monitor and record the outcome(s) of their behaviour (e.g. ward decides to monitor when restrictive practices are used with additional detail than is currently centrally requested)	23	34
12.1 Restructuring the physical environment	Make changes to the physical environment that facilitate successful de-escalation (e.g. converting a seclusion room into a sensory room)	20	30

Sometimes tools were used to support problem-solving, risk assessments and care plans:

> *A five-item recovery rounds checklist was developed by professional practice to prompt reflection and problem solving.*
>
> *Hernandez* et al.[99]

> *A daily nursing assessment was also initiated by nursing staff. This included a brief mental state component . . . and assessment of risk of violence or harm to self or others, [resulting in an] individual service plan for the following 24 hours. This tool was important as its aided communication between nurses.*
>
> *Sullivan* et al.[104]

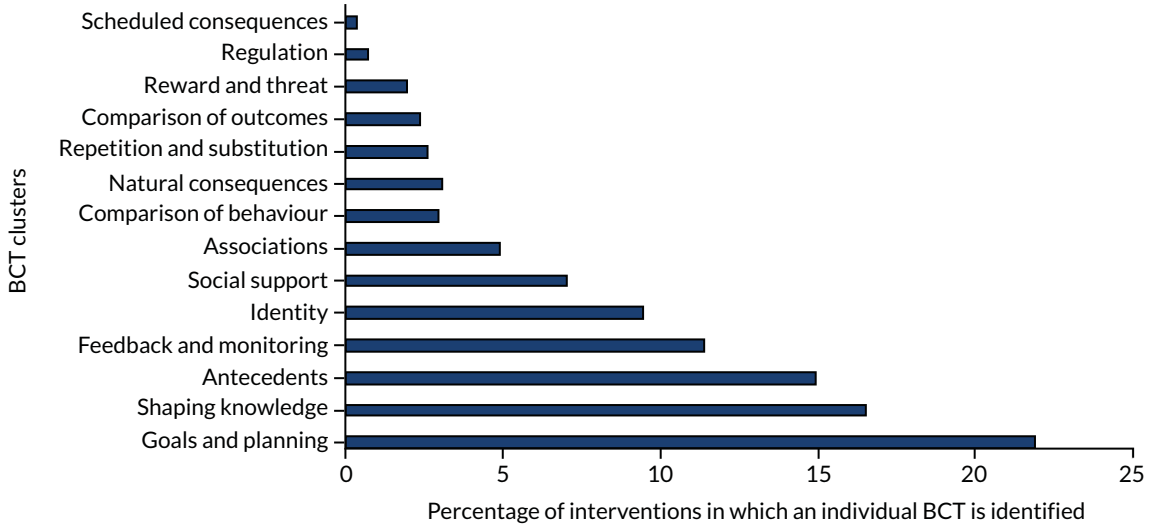

FIGURE 9 Cluster of BCTs (%).

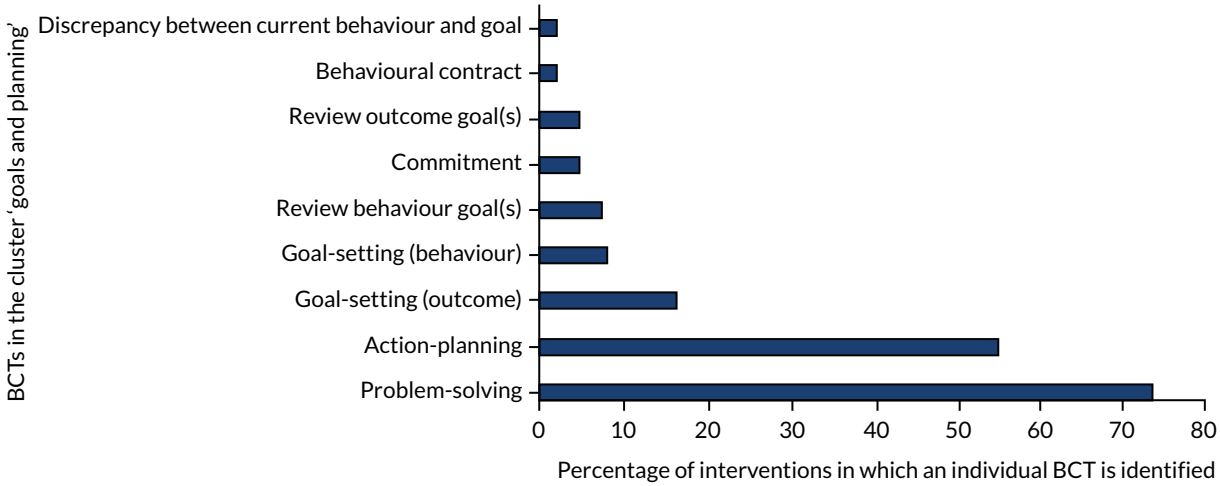

FIGURE 10 Behaviour change technique cluster 1: goals and planning.

'Action-planning' and 'goal-setting' followed a similar pattern, often as a result of problem-solving: planning with individual service users to try to prevent incidents that could result in restrictive practices, for example McEwan *et al.*,[123] or with staff teams when a ward had a target to reduce the number of episodes of restrictive practices, for example Lo.[74] There was also an indication of strategic action-planning and goal-setting, often through the formation of project steering groups to formulate institution-wide action plans to meet and review goals, for example Huckshorn.[133] Mention of reviewing goals was usually with reference to an individual service user and the goals documented in their care plan, for example Riemer.[156]

Fewer interventions described 'goal-setting' than 'action-planning'. Those that did consistently specified the reduction or elimination of restrictive practices, most commonly restraint and seclusion.[89] Other goals included improving staff cohesion and service culture:

> *The goals of the initiative included further reductions in S/R [seclusion and restraint] use and continued culture change to make the psychiatric inpatient and emergency services more patient centered and trauma informed.*
>
> *Wale* et al.[196]

There were no examples of goal-setting with individual staff to reduce their use of restrictive practices.

Eight interventions[24,176,190,201,213–216] described the use of a public 'commitment' (BCT 1.9) at strategic level to reduce restrictive practices:

> *Management has articulated (verbally and in writing) its intention of reducing the use of seclusion and restraint and/or to eliminate their use entirely.*
>
> *Colton*[176]

> *One of the more profound policy transformations was initiated by a declaration from the president and chief executive officer of RI [Recovery Interventions, Inc.], Gene Johnson, who mandated that seclusion and restraint practices would no longer be used and that the NFF ['no force first'] policy would be implemented companywide, including in its crisis centers.*
>
> *Ashcraft* et al.[24]

Three interventions described behavioural contracts to support individual staff commitment to reducing restrictive practices:[16,137,217]

> *[Trainees confirmed] that they would deliver the training when they returned to their service. The intention was that trainees should train end-users in all modules using the training materials they themselves had been trained with, in order to provide consistent training and maintain the integrity of the material.*
>
> *McEvedy* et al.[137]

One other intervention made reference to a behaviour contract but it was unclear whether it referred to service user or staff behaviour.[103]

Very few interventions discussed any discrepancy between the goal of the intervention and staff behaviour. *Safewards* has 'clear mutual expectations' that acknowledge this possibility, for instance to '… encourage the patients to refer to these expectations with staff, when they fail to uphold them'[213] whereas Clark *et al.*[217] describe the commitment that staff make to refraining from using restrictive practices, via care plans with individual service users. Clark *et al.*[217] also report that patients are supported to challenge staff:

> *For example, if a tertiary intervention is used without any attempt at secondary intervention strategies, the patient is well within their rights to state that staff have not fulfilled their side of the contract and that the restrictive practices used may not have been justifiable.*
>
> *Clark* et al.[217]

In only two instances was a discrepancy between current behaviour and intervention goal detected.[213,217]

Shaping knowledge

The cluster 'shaping knowledge' contained 16% of the overall BCTs and included those that capture the imparted information about 'antecedents' (BCT 4.2) (40%; $n = 60$) and 'instruction on performing the behaviour' (BCT 4.1) (90%; $n = 136$), half of the four BCTs within this cluster (*Figure 11*). 'Re-attribution' (BCT 4.3) and 'behavioural experiments' (BCT 4.4) were not detected. Information about antecedents was detected as being provided at the theoretical, service, ward and individual service user levels.

Information about antecedents for individual service users was sought either proactively on admission[145,212] or on a regular basis (daily[153] or weekly[200]) and either more broadly in a care plan or as part of a specific safety plan or risk assessment. Very few interventions reported the involvement of family in this process:[145,182,212]

> *Implementation of Safety Plans, a collaborative document completed by the patient with the staff that recorded stressors and triggers.*
>
> *Maguire* et al.[116]

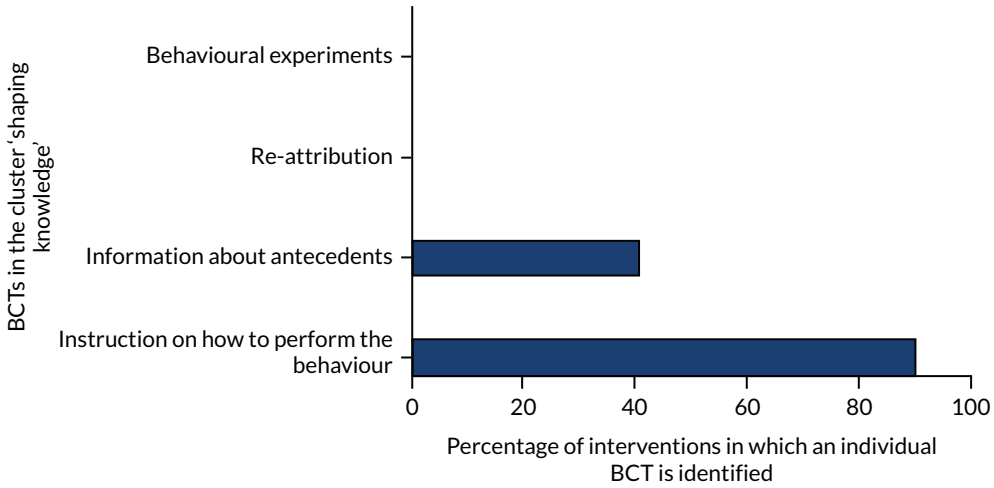

FIGURE 11 Behaviour change technique cluster 4: shaping knowledge.

This information could also be sought via debriefing after an episode of restrictive practice:

> *(d) identify triggers and antecedent behaviors that may have resulted in the use of restraint; (e) discuss alternative behavior and healthy coping strategies that may effectively minimize the future use of restraint should similar situations reoccur.*
>
> *Riahi* et al., *2016*[23]

Information about antecedents could be informed by review of aggregate service data:[153]

> *Change ideas were developed through sharing theories about why violence was occurring and what would help to mitigate this. A range of stakeholders contributed to this theory-building in a facilitated workshop, including staff of all levels of seniority and different professional backgrounds, service users and the police liaison officer.*
>
> *Taylor-Watt* et al.[153]

Staff training often included more general information about antecedents:

> *. . . staff were trained in early recognition of warning signs, thereby improving their risk-assessment skills, and their ability to prevent and manage aggression in early stages.*
>
> *Georgieva* et al.[150]

'Instruction on how to perform the behaviour' (BCT 4.1) was one of the most frequently coded BCTs, present in 91% ($n = 136$) of interventions. Interventions varied as to how much detail they provided. Some merely reported that staff were trained in de-escalation, whereas others provided more detail. Specific instructions were provided, for example regarding how to resolve conflict and de-escalate situations or use *Sensory Modulation* strategies. Training often included *Trauma-Informed Care* (see BCT 13.2: 'framing/reframing') as well as avoiding restrictive practices through use of risk assessment, care planning and respectful communication. Many interventions also provided instruction for when de-escalation had failed with elements about managing violence, restraint skills and post-incident care, as well as legal and ethics issues.

Some training involved service users[116] and when this was the case this had influenced the content of the training:

> *PMVA [Prevention Management of Violence and Aggression] training was revamped with much greater focus on communication, de-escalation and building therapeutic alliance.*
>
> *Lombardo* et al.[159]

Very little mention was made of training supporting staff to regulate their own emotional responses; where it was mentioned it included raising awareness of and control of feelings, especially fear and anger.[15,129]

Antecedents

The BCT cluster 'antecedents', involving factors that might influence whether or not restrictive practices can be avoided, was a theme throughout many interventions, typically in terms of preventing situations where service users might become distressed and conflict occur. 'Antecedents' was the third most populated cluster, containing 15% of BCTs (*Figure 12*). Half of the six BCTs constituting the antecedents cluster were identified: 'restructuring the physical environment' (BCT 12.1), 'adding objects to the environment' (BCT 12.5) and 'restructuring the social environment' (BCT 12.2). 'Avoidance/reducing exposure to cues' (BCT 12.3), 'distraction' (BCT 12.4) and 'body changes' (BCT 12.6) were not detected. Broader ward- and organisation-level changes to the physical and social environment described here as BCTs that aim to reduce antecedents by addressing individual service user needs are described elsewhere under 'prompts'.

Restructuring the physical environment

'Restructuring the physical environment' was a feature of 20% ($n = 30$) of coded interventions and considered any changes made to the ward itself, including the introduction or removal of specific rooms and changes made to the fabric of the building. Nineteen (13%) interventions included the creation of private rooms (e.g. Lombardo *et al.*[159]) with a low-stimulus environment, often created out of a seclusion room, called comfort, sensory, quiet or 'Snoezelen' rooms. Although these rooms were aimed at changing service user behaviour, they gave staff an alternative resource to help support their aim of de-escalation. Sivak[191] reports that the walls were painted in a pale-green colour; one had a mural and another included an area of chalkboard paint at a convenient height for clients to use if they chose to do so. The noise level was reduced by the installation of drop ceilings, and light panels with sky scenes were used to create a sense of being outside.[191]

Service users were often involved in deciding how they should be decorated:

> *[S]uggestion boxes were also placed in both ward sitting rooms [. . .]. Suggestions for the design and decor were made by patients, carers and staff. These included; colours of paint, design of curtains, style of pictures for the walls, types of furniture, brightness/levels of lighting and layout of furniture.*
>
> *Smith and Millar*[158]

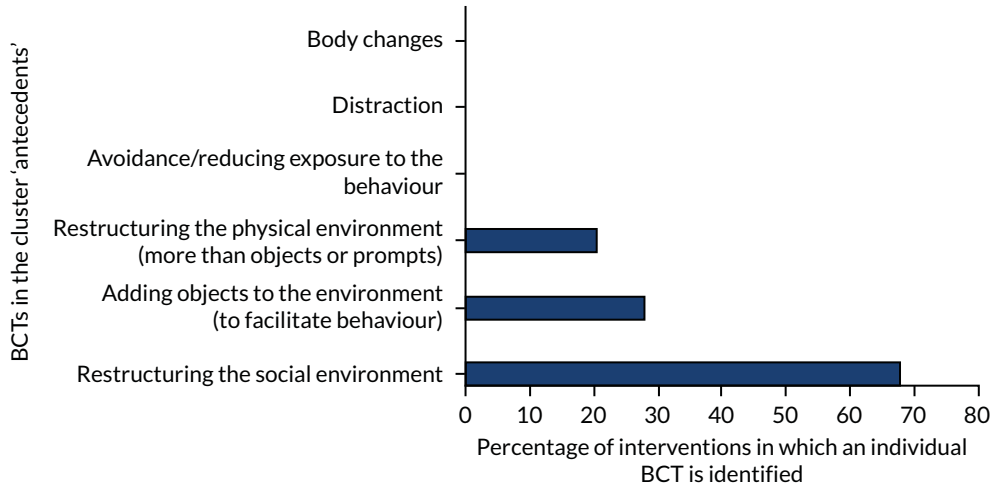

FIGURE 12 Behaviour change technique cluster 12: antecedents.

Other changes to the general physical environment included upgrading of wards to make them feel more homely or comfortable:

> . . . *inexpensive physical changes, including repainting walls with warm colors, placement of decorative throw rugs and plants, and rearrangement of furniture.*
>
> *Borckardt* et al.[107]

Two interventions included physical restructuring of outside areas with the creation of a ward garden and allotment.[83] Some interventions did not create *Sensory Rooms* but created separate space for service users to watch television or designated quiet areas.[158]

Adding objects to the environment

Many interventions also added objects to the environment (BCT 12.5). The most frequently mentioned was *Sensory Modulation* equipment, which was used in 16 interventions; it could be a portable box of equipment or could be equipment kept within a sensory room:

> *This range of objects included a massage chair, rocking chair, beanbag, faux-fur blankets, weighted blankets, weighted soft toys, 'stress' balls, portable audio and DVD [digital versatile disc] players with relaxing sounds and visual scenes, aromatic oils and diffusers, scented hand creams, and adjustable coloured ambient lighting.*
>
> *Sutton* et al.[152]

Objects such as rugs and plants provided a more homely feel, whereas others were there to provide activities for service users, and included games consoles, reading material, games and puzzles, DVDs and exercise equipment:

> . . . *exercise machines were added as options to help the service users burn energy and safely manage stress.*
>
> *Riemer and Corwith*[192]

Another category of object added to the environment were noticeboards displaying information for staff, service users or both. *Safewards* encouraged staff to have posters of de-escalation tips in their office:

> *To change the Soft Words poster every day or so. To remind other members of the team as to what the Soft Words are. To draw attention to the Message of the Day poster in the nurses office.*
>
> Safewards[213]

Another category of things added to the environment is items to alert staff of incidents; this includes personal alarms,[150] two-way radios,[218] pagers[74] and closed-circuit television (CCTV),[83] all of which were used in at least one intervention.

Restructuring the social environment

This BCT (12.2) is intended to record changes made to the social environment in order to facilitate the performance of a desired behaviour or create barriers to an unwanted behaviour. Many of the interventions made changes to the social environment of the setting including changing the way that people interact with each other, from the strategic through to the individual level. As such, this BCT was divided into four themes: stakeholder involvement, increased access to staff, improved communication and promoting social contact.

Stakeholder involvement

Stakeholders could be service users, relatives or ward staff. The main aspect of interventions coded under this category was that of service user involvement (referred to by 25% of interventions; see *Service user involvement in interventions*). When detail was provided, it was most often referred to in terms of involvement in individual care, either in care planning or debriefing after an incident of

restrictive practice had occurred. Service user involvement that was not related to individual care was mostly consultation on aspects of an intervention, for example the design of a sensory room. Some interventions employed service users as consultants, sometimes in a paid capacity:

> *Two patients from the ward were recruited and paid for their time and input on the local working party.*
>
> *Maguire* et al.[197]

A small number of these interventions employed service users to deliver training:

> *Consumer advocates provided staff education on such topics as respect, therapeutic approaches to providing care, trauma-informed care, and reducing the risk for violence.*
>
> *Riemer and Corwith*[192]

Other interventions had service user representation on committees, at either ward level or at a more strategic level:

> *We established a multidisciplinary seclusion/restraint minimisation committee, chaired by a peer specialist.*
>
> *Ash* et al.[6]

Others consulted existing committees consisting only of service users:

> *The Consumer Advisory Group, whose membership comprised patient representatives and Consumer Consultants, was regularly consulted.*
>
> *Ching* et al.[115]

There was very little involvement of relatives and informal carers. Two interventions provided support for families, one by providing education and support and the other by opening a resource centre:

> *To enhance the role of families in treatment and the organization, the Family Resource Centre opened in 2013 to provide a space for families to share experiences, access resources, attend family-specific groups, and connect with other families for support and encouragement.*
>
> *Riahi* et al.[23]

The rest of the interventions that made references to families and informal carers did so with reference to either their involvement in care planning or post-incident debriefing.

Some interventions made specific reference to the involvement of ward staff in the development of some interventions. According to Cambridgeshire and Peterborough NHS Foundation Trust,[85] all staff were engaged in considering new approaches for initiating proactive care and eliminating the use of force, which helped to promote positive conversations and avoid defensiveness. Ideas about small changes were encouraged and the appreciative inquiry model was used to develop questions, such as:

> *What are we doing well that we should continue and build on? What should we stop doing? What should we start doing or do differently?*
>
> *Cambridgeshire and Peterborough NHS Foundation Trust*[85]

The importance of ward staff in the implementation of interventions was acknowledged:

> *A combined top-down and bottom-up approach was used: leadership and support from the top was seen as essential while acknowledging that changes could not be implemented without the active involvement, participation and fiat of the professionals working on the wards.*
>
> *Mann-Poll* et al.[212]

Explicit managerial support formed part of many interventions,[23,106,116,133,192,212,219] either institutionally or at ward level.[106] *Six Core Strategies* implementation guidance emphasised that staff should be made aware of the involvement and commitment of senior staff in reducing seclusion and restraint, including the chief executive officer (CEO)/administrator, the medical director and other senior staff.[133]

Many interventions had a specific steering group[17,115,116] including senior managers who provided monitoring and strategic direction for the interventions.[83] In some interventions ($n = 10$), the multidisciplinary nature of these groups was emphasised:

> *Establishment of a project management structure that included consumer consultants, managers, clinicians and academics of all disciplines.*
>
> *McEwan* et al.[123]

Improved interaction between staff and service users

Improving interaction between service users and staff was attempted in several ways, including increasing the number of staff available and promoting access to existing staff. Increased staffing was a feature of 12 interventions; some interventions simply increased staffing ratios,[150,220] either all the time or in crisis situations.[109] Several interventions introduced a rapid response team with the aim of providing expertise in a crisis situation, for example Hernandez *et al.*,[99] whereas others added expert practitioners to ward teams:

> *Two City Nurses were appointed for the project and were recognized clinical experts in acute inpatient care with long experience of practice development work. They worked with the wards' staff, 3 days per week, using the working model mentioned earlier, to bring about change towards low-conflict, low-containment, high-therapy nursing.*
>
> *Bowers* et al.[102]

Other interventions sought to improve service user access to staff. One intervention used a direct booking facility for an appointment to see a doctor, whereby doctors' availability was displayed in the communal area, enabling patients to book a mutually convenient slot.[83]

However, others encouraged nursing staff to proactively approach service users[209] and prioritise service user need over administrative duties or increased observations:[113]

> *. . . he asked can we go a walk and I said yes, let's just go, and he said that he thought he had no chance as you were there on the computer.*
>
> *McEwan* et al.[123]

Improved communication was a frequent part of the social restructuring of the service setting to reduce conflict. This aimed to improve communication between staff, between service users or between staff and service users. When the aim was to improve communication between staff and service users, it could take place with individual service users, prompting staff to support service users in expressing their feelings and wishes.[103,123] It could also be a collective endeavour with supportive ward community meetings to involve both service users and staff.[83] Putkonen *et al.*[17] also report the following:

> *They also suggested new ways and practices to decrease fear, violence, and coercion and brainstormed with staff and doctors about the ward rules and practices during weekly community meetings (45 minutes).*
>
> *Putkonen* et al.[17]

Communication between staff about individuals and ward issues were enhanced in some interventions via ward meetings,[17,212,221] case reviews,[23,106] safety huddles or supervision:

> *. . . the IPCU [intensive psychiatric care unit] safety huddle was subsequently born. This was a 10-minute 'huddle' to focus on potential or actual safety issues. The focus was on anticipation and prevention; nursing assistant staff were involved and contributed to its facilitation.*
>
> *McEwan* et al.[123]

> *Clinical supervision is an invaluable and objective way of communicating the plan across three shifts. One successful approach uses a single-person contact to meet with each of the employees across shifts.*
>
> *Visalli and McNasser*[103]

Few interventions mentioned communication with relatives and carers, for example Mann-Poll *et al.*,[212] with the exception of communicating service rules and behavioural expectations:

> *Clear boundaries and limitations with respect to acting out behavior were communicated at admission.*
>
> *Mann-Poll* et al.[212]

There was some evidence of communication of behavioural expectations to staff; *Safewards* used 'mutual expectations' and ward rules and expectations of behaviour were publicly displayed:

> *Step 4, get your mutual expectations printed as a laminated poster to the ward, to your specified design with your specified content. Please hang this in a prominent and public space where it can be read by patients and staff.*
>
> Safewards[213]

One other intervention[107] saw the introduction of a strategy to promote respectful communication with service users:

> *. . . all clinical staff to engage in the following communication behaviors with inpatients: 'Acknowledge' patients, 'Introduce' themselves, articulate the anticipated 'Duration' of the clinical contact, 'Explain' the reason for the contact, and 'Thank' patients for their cooperation.*
>
> *Borckardt* et al.[107]

Several interventions included aspects surrounding rules or policy changes. Some rules aimed to change how restrictive practices were governed or recorded.[146] Maguire *et al.*[116] report that this involved documentation of care plans to identify conditions and interventions for ending seclusion, allowing 'transparency for the patient and consistency for the clinical team'. In addition, a project officer was appointed and the changes to practice were captured in a rewritten Seclusion Policy and Procedure.[116]

Several interventions reviewed existing rules with the intention of ascertaining whether or not they were necessary:[107,116,139] For example, guidance for implementation of the 6 Cs draws attention to the need for staff to look critically at a facility's regulations, identifying that they may be neither logical nor necessary:

> *Most inpatient facilities have historical rules that are habits or patterns of behavior that are not congruent with a non-coercive, recovery facilitating environment, for instance rules such as putting people who self-abuse in non-lethal ways in restraint, or putting people who are intrusive only in restraint.*
>
> *Huckshorn*[133]

> *. . . a team for each unit that was tasked with reviewing and modifying unit rules and policies to be less restrictive to patients or eliminating unit rules that were too restrictive.*
>
> *Borckardt* et al.[107]

Promoting more flexible responses from staff to service users was an aspect of several reviews of rules:

> *. . . further flexible approach to supporting patients, e.g. to have several spells of time off the ward to defuse agitation.*
>
> *McEwan* et al.[123]

Sometimes, increasing flexibility of rules was instigated by ward staff:

> *From a bottom-up perspective, teams could choose their own package of interventions tailored to their ward. They could for example choose to make their ward rules more flexible.*
>
> *Mann-Poll* et al.[212]

Service users were occasionally involved in this process:[17]

> *Staff and patients collaborated to review the unwritten and arbitrary 'unit rules' that often are sources of conflict.*
>
> *Maguire* et al.[116]

Promoting social contact

One aspect of restructuring the social environment to reduce conflict was promoting socialising, either between staff and service users[139] or between service users.[83] Although interventions that provided greater opportunities for service users to socialise with each other are not specifically targeting staff behaviour, similar to *Sensory Rooms*, they give staff a broader repertoire of resources to use in de-escalation.[123] The 'know each other' aspect of *Safewards* was the most comprehensively described initiative promoting social interaction between service users and staff:

> *. . . with consent, capacity and confidentiality considered, staff and patients provide non-controversial information about each other, this could include hobbies, music, TV programmes. This information is then placed in a file and made available in communal areas.*
>
> Safewards[213]

Shared meals featured in some interventions:

> *Shared lunches with staff and patients on male High Dependency Unit, promoting engagement and establishment of relationships.*
>
> *Northumberland, Tyne and Wear NHS Foundation Trust*[83]

Other shared tasks promoted closer interaction; one intervention[17] focused on restrictive practice. In accordance with patient requests:

> *. . . some patients and staff volunteered to work together 1 hour per week on building projects . . . Because many patients and staff found it difficult to discuss their experiences of coercion and violence, they wrote, photographed, and illustrated a book together, titled 'Behind Locked Doors'.*
>
> *Putkonen* et al.[17]

Only one intervention described creating opportunities for families and carers to socialise:

> *To enhance the role of families in treatment and the organization, the Family Resource Centre opened in 2013 to provide a space for families to share experiences, access resources, attend family-specific groups, and connect with other families for support and encouragement.*
>
> *Riahi* et al.[23]

Activities on wards for service users were seen as a way of reducing restrictive practices. Activities might be individual or group-based activities groups were more frequently described. Staff were sometimes trained to deliver group activities or a specific staff member might be responsible; in one example, data analysis showed when incidents were more likely to occur on a female admission unit, and, in response, an activity coordinator was introduced on the unit throughout the week.[83]

Some groups were explicitly treatment orientated, whereas others were recreational:

> *. . . treatment-based groups/classes are matched with a person's assessed needs . . . As an educational endeavour, staff are trained to offer individual groups inside and outside the facility. Treatment groups or classes include communication, managing mental health, anger management, assertiveness training, problem solving, and community housing skills.*
>
> *Visalli and McNasser*[139]

One intervention recognised the importance of activities being available to all service users, even those in the PICU:[133]

> *Has leadership reviewed the facility's plan for clinical treatment activities in an effort to assure that active, daily, person centered, effective treatment activities are offered to all persons receiving services; that these services are offered off living units preferably; and that persons attending have some personal choice in what activities they attend. The minimal criteria to meet under this objective is to assure that service recipients are not spending their days in enclosed areas with no active effective psycho-social or psychiatric rehabilitation occurring that is effective in teaching living, learning, recreational and working skills.*
>
> *Huckshorn*[133]

Only one initiative promoting activities – Star Wards – was described as having been developed by service users. Star Wards include 75 ideas for meaningful activities that service users can consider, especially in the evenings or at weekends when there are fewer planned activities. They range from simple changes, such as making magazines and newspapers available, to themed social events and activities.[125]

Feedback and monitoring

Behaviour change technique cluster 2, 'feedback and monitoring', accounted for the monitoring of ward data and, if they were fed back to the ward, in what ways this feedback took place. Eleven per cent of BCTs were in this cluster (BCTs 2.1–2.7) (*Figure 13*). Both feedback and monitoring related primarily to outcomes (reduced restrictive practices) of the behaviour (de-escalation) although there was some evidence of monitoring of behaviour. Monitoring was either self-monitoring (including ward-level monitoring) or by others, for example at system level through incident reports. 'Biofeedback' (BCT 2.6) was not detected.

Feedback on behaviour

'Feedback on behaviour' (BCT 2.2) occurred through post-incident debriefing, team meetings or clinical supervision when near-misses were discussed. This feedback was supported by intervention structures such as the introduction of tools such as safety crosses:

> *Displaying safety crosses . . . a simple wall calendar that staff can mark in colour to show red days (when there was an incident of physical violence) or green days (incident-free). This evolved to include orange incidents, reflecting a near miss or build-up of hostility – which are not usually recorded in any form.*
>
> *East London NHS Foundation Trust.*[85] *Contains public sector information licensed under the Open Government Licence v3.0*

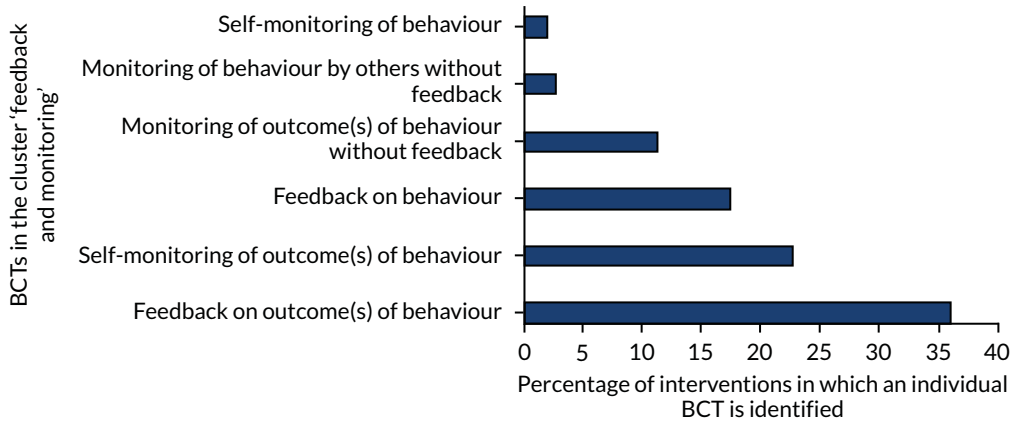

FIGURE 13 Behaviour change technique cluster 2: feedback and monitoring.

Self-monitoring of behaviour

'Self-monitoring of behaviour' (BCT 2.3) was coded when interventions encouraged ward staff to take the lead on reflecting on not just incidents but near-misses and times when de-escalation had been successfully used:

> *The nursing team started collecting and recording improvement data on safety crosses regarding safety huddle frequency, daily goal-setting frequency, and restraint incidence. Weekly improvement data were . . . collected on the quality of patient risk assessments and safety plans, as well as the extent of service user involvement in safety planning.*
>
> *McEwan* et al.[123]

One intervention involved the service user in this process:

> *If a crisis was averted, staff members and the patient reviewed the crisis management plan and determined which strategies were most effective.*
>
> *Jonikas* et al.[180]

Only one intervention described staff reflection on the way in which they individually related to service users:

> *. . . participants practised self-awareness techniques to gain a more profound understanding of their personal habits, ways of behaving on the ward in relation to patients and teams.*
>
> *Kontio* et al.[199]

Monitoring of behaviour by others without feedback

Only three interventions described monitoring (as distinct from self-monitoring) staff behaviour (BCT 2.1). D'Orio *et al.*[149] used CCTV to monitor the behaviour of staff. Short *et al.*[157] monitored broader staff safety performance data and Hochstrasser *et al.*[110] described monitoring processes to prevent incidents.

Feedback on outcomes of behaviour

Many interventions monitored outcomes of behaviour in terms of the number of restrictive practices that occurred in the setting, for example the number of restraints or duration of seclusion. Most interventions fed back the outcomes of behaviour (i.e. the number of restraints) via institutional recording systems that was fed back at either ward[186] or institutional level:[132]

> *Each morning the project senior nurse and cultural anthropologist – psychotherapist-counselor discussed with staff the violent incidents that occurred and reported on the practices, restrictions, and alternative*

> *methods used, according to the postevent analysis sheet. These meetings identified and praised successful interventions and otherwise helped the staff to improve their practices.*
>
> *Putkonen* et al.[17]

> *It needed to capture the essential data relating to 'how many' incidents and qualitative information regarding the antecedents through meaningful postincident debriefs with patients and staff. This information enabled the ward team to make real-time changes to patients' individual care plans. Good reporting practices translated data into usable information.*
>
> *Lombardo* et al.[159]

Some interventions used debriefing including both service users and staff involved in an incident of restrictive practice.[222] This was seen as feedback on the outcomes of the behaviour (and could also include self-monitoring of the outcomes of behaviour), depending on the format of the debrief and whether or not staff were asked to reflect on their practice.

Self-monitoring of behaviour outcomes

Thirty-four interventions described using self-monitoring of outcomes of behaviour (BCT 2.4). This was where wards monitored their own incidents rather than monitoring being a centralised system-level process. Self-monitoring could also be a part of post-incident debriefing depending on how it was described as being carried out.

Monitoring behaviour outcomes without feedback

Feedback as a result of monitoring was not always provided, for example Short *et al.*[157] In a number of cases it was not reported whether or not these data were fed back to ward staff; for example, two studies[79,223] were clear that data were being collected without staff knowledge, which led to the assumption these data were not being fed back during the intervention.

Identity

The cluster 'identity' referred to the identity of the individual staff members and 9% of the BCTs identified were in this cluster. Two of the five potential BCTs in this cluster were detected: 'framing or reframing' (BCT 13.2) and the 'identification of the self as a role model' (BCT 13.1). The BCTs 'incompatible beliefs' (BCT 13.3), 'valued self-identity' (BCT 13.4) and 'identity associated with changed behaviour' (BCT 13.5) were not detected (*Figure 14*).

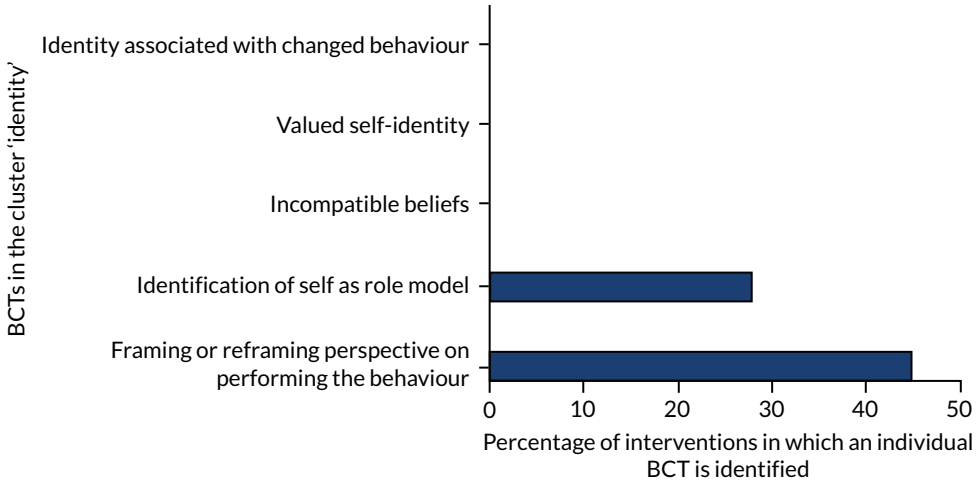

FIGURE 14 Behaviour change technique cluster 13: identity.

Framing/reframing

Framing is the conscious adoption of a different perspective on behaviour in order to change emotions about performing a behaviour. In terms of the interventions, this was dominated by those that introduced changes in nursing philosophy to service user-centred approaches. This is illustrated by the *Safewards* approach of having positive regard for service users:

> *Positive words: Aims to create a positive view of the patient at 'handover', even when a troublesome behaviour is being reported, by also saying something positive about the patient.*
>
> *Cabral and Carthy*[15]

Training sought to reframe restraint as avoidable and a true last resort:

> *Training is provided which gives staff the key competencies and supports the view that restraint is used as a last resort to manage risk behaviour associated with aggression, violence and acute behavioural disturbance.*
>
> *Restraint Reduction Network*[214]

Different ways of understanding service user distress were a common feature of interventions. Approaches described how behaviour might be affected by environmental/individual interaction. Maybo Conflict Management Training[224] follows the principles of *Positive Behaviour Support*, emphasising how behaviour is used as a form of communication and heavily influenced by both internal and external factors. Participants have a greater empathy for individuals once these factors are understood and a greater appreciation of the depth to which quality of life is compromised. This involved training sessions about sensory processing models, and *Trauma-Informed Care* in particular:

> *For trauma-informed care, all unit staff attended a half-day standardized training seminar on the nature of trauma and its effects on patients' experiences, physiology, and psychological processes, along with instructions on how to minimize engaging in behaviors that could exacerbate trauma related reactions from patients.*
>
> *Borckhart* et al.[107]

> *. . . training explains how a client's history can influence their experience and reaction to seclusion and restraint.*
>
> *Colton*[176]

Role modelling

Promoting 'self-identification as a role model' (BCT 13.1) was achieved in a number of ways. The most common was using a 'train the trainers' model, which was used in 16 interventions, for example Visalli and McNasser,[139] when select staff members became trainers of their colleagues and often retained a mentoring expert role afterwards. Intervention champions were another commonly used method of role modelling, for example Yakov *et al:*[185]

> *There are Safewards champions for each ward, who provide practical support and help with implementation, training and coaching.*
>
> *Tees Esk and Wear Valleys NHS Foundation Trust.*[85] *Contains public sector information licensed under the Open Government Licence v3.0*

Twelve interventions[85,88,90,97,100–103,129,132,135,159,181,185,187,197,225] used expert practitioners on wards to disseminate good practice:

> *Two City Nurses were appointed for the project, and were recognized clinical experts in acute inpatient care with long experience of practice development work.*
>
> *Bowers* et al.[101]

> *Ambassadors from within the teams were appointed to discuss the use of coercive measures with their colleagues and to help stimulate changes in attitudes and practices.*
>
> *Boumans* et al.[225]

Four interventions made use of information sharing and exchanges between organisations that was coded as role modelling in a broader manner:[85,209,221,226]

> *GGZ Nederland, the Dutch mental health umbrella organization, has supported exchange programs that organize quarterly meetings, allowing hospitals to learn from each other.*
>
> *Noorthoorn* et al.[221]

Social support

The cluster 'social support' (*Figure 15*) accounted for 7% of the BCTs in the interventions and all three possible BCTs were identified as taking place within staff teams at ward level, more broadly within the organisation, or being shared with external agencies. Social support was either 'unspecified' (BCT 3.1), or further defined as either 'emotional social support' (BCT 3.3) or 'practical social support' (BCT 3.2).

Practical support included 'hands-on' support in terms of sharing ideas for good practice in reducing restrictive practices. Taxis[227] reported that at the outset a 'weekly RN [registered nurse] discussion group' was formed, with the goal of addressing practice issues, by raising awareness of the restraint and seclusion incidents, and to 'build a consensus' for increased use of less restrictive alternatives. Rather than providing ready-made answers for all situations, the goal was to 'form a collegial environment in which these matters could be discussed'. This collegiality would serve as an important element as the programme progressed.

Melin[69] reported that the meeting was intended to be a forum in which staff involved in treatment could have a positive and constructive dialogue about the interventions and the behaviour of colleagues. Guidelines included making sure that treatment staff were back in control before the meeting started, clarifying what happened, reviewing how staff responded and looking for ways to improve and strengthen responses in the future. Treatment staff were to be supported and encouraged, and trust in colleagues was to be expressed.

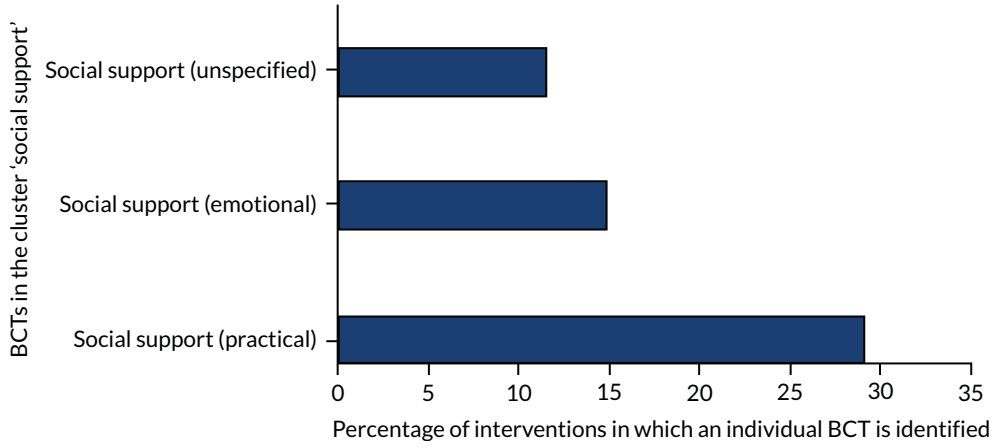

FIGURE 15 Behaviour change technique cluster 3: social support.

Safety huddles were coded as involving practical social support. The Northumberland, Tyne and Wear NHS Foundation Trust[83] reported that the Positive Safe Team provide ongoing support including training, consultancy and opportunities for sharing good practice.

Some training providers offered ongoing practical social support for participants[228] and, depending on the nature of training, it can offer practical social support in terms of feedback on role play.

The use of rapid response de-escalation teams, which featured in 12 interventions, was classed as providing practical social support.

Associations

As illustrated in *Figure 16*, associations were detected in 5% of BCTs in 57 interventions, although only one BCT 'prompts or cues' (BCT 7.1). None of the other BCTs in this cluster were detected: 'cue signalling reward' (BCT 7.2), 'reduce prompts or cues' (BCT 7.3), 'remove access to the reward' (BCT 7.4), 'remove aversive stimulus' (BCT 7.5), 'satiation' (BCT 7.6), 'exposure' (BCT 7.7) or 'associative learning' (BCT 7.8). Associations were predominantly prompts or cues (BCT 7.1) in the form of standardised assessments for service users on wards relating to risk of violence.[127] Mersey Care NHS Foundation Trust[229] reported training staff in the PICU in the use of a structured risk assessment tool: the DASA-IV. DASA-IV scores were incorporated into daily care-planning. DASA-IV is a seven-item scale used for daily assessment of inpatients. Higher scores indicate a possible need for increased attention over the following 24 hours to reduce the risk of a serious violent incident.

Other prompts included posters[181,213] displayed in offices or wards and flow charts reminding staff of less restrictive practices (e.g. Alberta Health Services).[230]

Comparison of behaviour

As illustrated in *Figure 17*, cluster 6, 'comparison of behaviour', comprises three BCTs: 'demonstration of behaviour' (BCT 6.1), 'social comparison' (BCT 6.2) and 'information about others' approval' (BCT 6.3). Three per cent of detected BCTs were in this cluster and all three BCTs in this cluster were identified. Comparison of behaviour consists of experiencing demonstrations of the behaviour (BCT 6.1), usually as part of training sessions demonstrating successful de-escalation. 'Social comparison' (BCT 6.2) was found in everyday practice, through being compared with other wards or wards publicly acknowledging restraint rates, and receiving information about other people's approval (BCT 6.3).

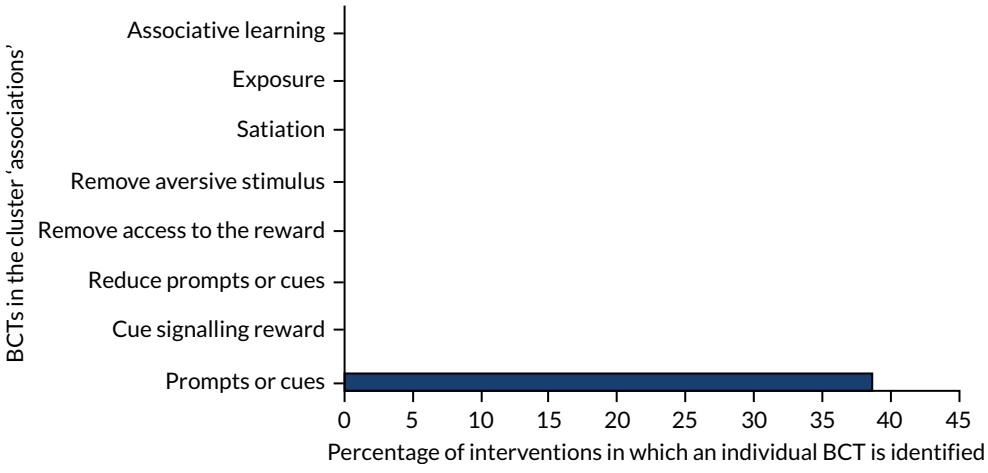

FIGURE 16 Behaviour change technique cluster 7: associations.

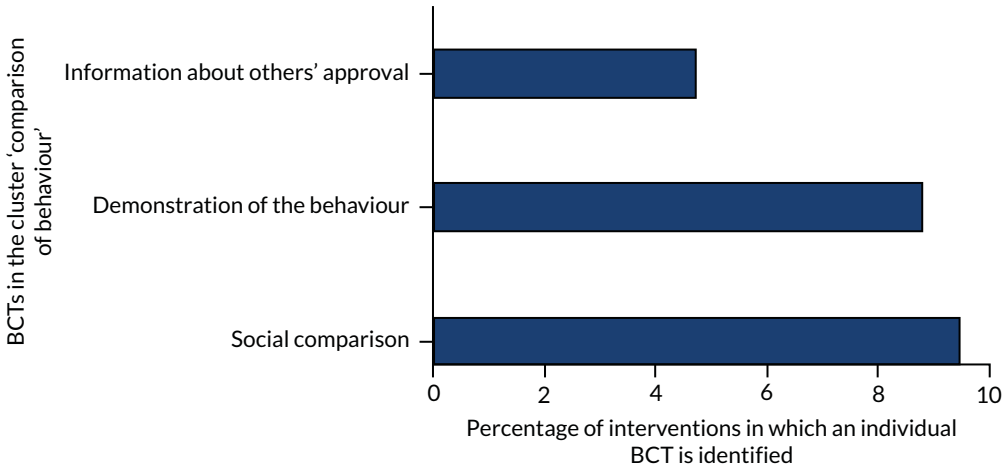

FIGURE 17 Behaviour change technique cluster 6: comparison of behaviour.

Thirteen references,[16,93,95,96,141,144,162,176,184,198,208,231,232] described de-escalation behaviour being demonstrated (BCT 6.1) as part of their training intervention, either by trainers or through role-play scenarios. 'The *Six Core Strategies* intervention used Social comparison' (BCT 6.2) at ward level, encouraging linked facilities to engage in healthy competition (e.g. by displaying data in open areas).

The Restraint Reduction Network promoted similar social comparison as 'peer assessment', in which one team or unit would be responsible for assessing the performance of another. This was felt to be effective in increasing motivation and engagement, and also in enhancing deeper understanding of assessment, and sharing good practice.[233]

It became a feature at individual staff level within two interventions, one using *Safewards*. A well-publicised 'star of the week' initiative at Northumberland, Tyne and Wear NHS Foundation Trust was enthusiastically supported by staff and patients, and allowed a mild sense of competition between peers.[83]

'Information about others' approval' (BCT 6.3) was identified when there were descriptions of communication of support and approval from others. At ward level, one study described growing support from a consultant psychiatrist for intervention activities that had been instigated by nursing staff. It was also a feature of the social comparison activities when peers or service users nominated the best de-escalator or 'star of the week'. Safety crosses were displayed publicly to show when the last incident of restraint had occurred:

> *Displaying safety crosses in the public area of the ward. This is a simple wall calendar that staff can mark in colour to show red days (when there was an incident of physical violence) or green days (incident-free). This evolved to include orange incidents, reflecting a near miss or build-up of hostility – which are not usually recorded in any form. This was an accessible way to share incident data and provided a focal point on the ward for staff, people using the service and visitors.*
>
> *East London NHS Foundation Trust.[85] Contains public sector information licensed under the Open Government Licence v3.0*

Natural consequences

As illustrated in *Figure 18*, in the BCT cluster 'natural consequences' a distinction is made between natural consequences and scheduled consequences such as a predetermined reward for performing a behaviour.

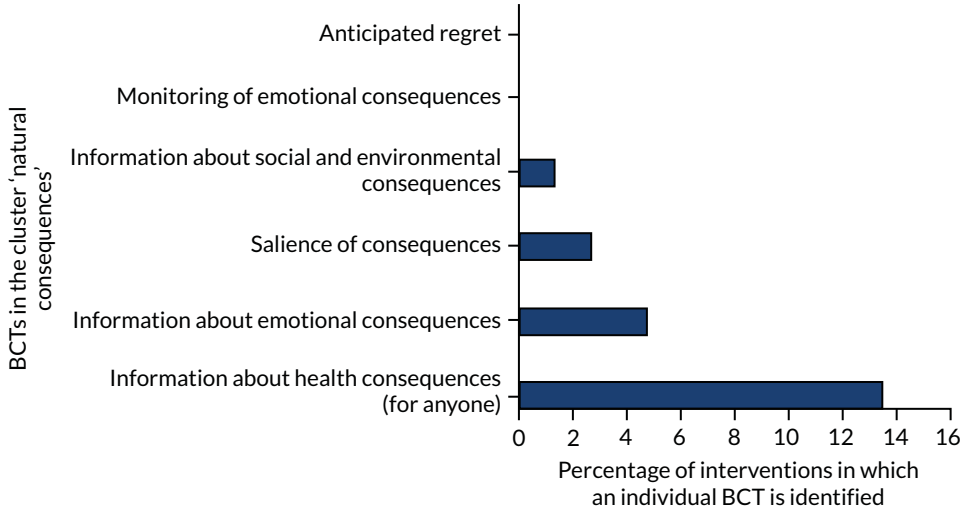

FIGURE 18 Behaviour change technique cluster 5: natural consequences.

A total of 3% of BCTs identified were in this cluster and included four BCTs: 'information about health' (BCT 5.1), 'information about emotional consequences' (BCT5.6), 'salience of consequences (BCT5.2)', 'information about social and environmental consequences' (BCT 5.3). 'Monitoring of emotional consequences' (BCT 5.4) and 'anticipated regret' (BCT 5.5) were not detected in any interventions.

The consequence of the desired behaviour (defined as successful de-escalation) was the elimination of the harmful effects of restrictive practices. Interventions described consequences of de-escalation failure predominantly on service users, although some interventions also referred to consequences for staff (e.g. Forster *et al.*).[234] Some interventions merely talked about 'negative' consequences without specifying what these were, and so these were coded as health consequences. Health consequences (BCT 5.1) were specifically described in 23 interventions, primarily about physical risks to the service user. For example, *Space Training*[235] included emphasis on understanding inherent risks of physical interventions, with a specific focus on 'positional asphyxia'.

Some interventions ($n = 7$) emphasised physical and/or emotional health consequences, including interventions with a noticeable focus on the impact of restraint on the service user,[123,143,195] and others that focused on health consequences for staff:[70,141,236]

> *. . . the goal of the program was both to reduce episodes of seclusion and restraint and reduce staff injuries. This intervention was designed to counteract the frequently encountered attitude that the real outcome of such programs is to place staff members at higher risk.*
>
> *Forster* et al.[234]

> *. . . a series of mandated workshops on trauma-informed care, were created that included education on the neurobiological and psychosocial effects of trauma, the relationship of dissociative symptoms and self-harm to posttraumatic stress disorder (PTSD), and the retraumatization that occurs from being restrained or witnessing use of restraints and seclusion.*
>
> *Chandler*[201]

The broader social and environmental consequences of restrictive practices were referred to by only one study:

> *Has leadership evaluated the impact of reducing S/R [seclusion and restraint] on the whole environment? (This includes issues such as increased destruction of property; extended time involved in de-escalation attempt, additional admission assessment questions, debriefing activities and processes to document event, etc.)*
>
> *Huckshorn*[133]

'Salience of consequences' (BCT 5.2) was coded when interventions used particular methods to emphasise the consequences of not performing successful de-escalation and restrictive practices being used:

> *Each staff member experienced 5-point restraints first-hand, and many cited that experience as pivotal in their decision whether or not to restrain a patient in a state of agitation when queried 1 year after the course.*
>
> *Forster* et al.[234]

> *The service users educated the project workers in consumer specialist meetings (1 hour per week) about their own experiences with violence and coercion, individual triggers of violence, and effective calming activities.*
>
> *Putkonen* et al[17]

This often included service user testimony about the consequences of their traumatic experiences of restrictive practices, for example Riley *et al.*[134]

Repetition and substitution

As illustrated in *Figure 19*, 3% of the BCTs detected were in the cluster 'repetition and substitution' and consisted of three of the seven possible BCTs: 'behavioural practice/rehearsal' (BCT 8.1), 'habit formation' (BCT 8.3) and 'reversal' (BCT 8.4). 'Behaviour substitution' (BCT 8.2), 'overcorrection' (BCT 8.5), 'generalisation of target behaviour' (BCT 8.6) and 'graded tasks' (BCT 8.7) were not detected in any interventions.

Twenty-eight interventions described staff taking part in activities to practise and rehearse de-escalation skills. This was most typically in the form of role-play activities:

> *These team-building exercises, it was hoped, would highlight the different roles staff members play in the restraint process, crisis intervention, and de-escalation techniques. It was expected that these exercises would help to clarify the roles staff members play in a crisis and allow them to practice crisis management techniques.*
>
> *Melin*[69]

Detail was rarely provided about whether or not staff played the role of the service user. Some interventions did give details, with one using a fully immersive role-play scenario using actors in other roles.

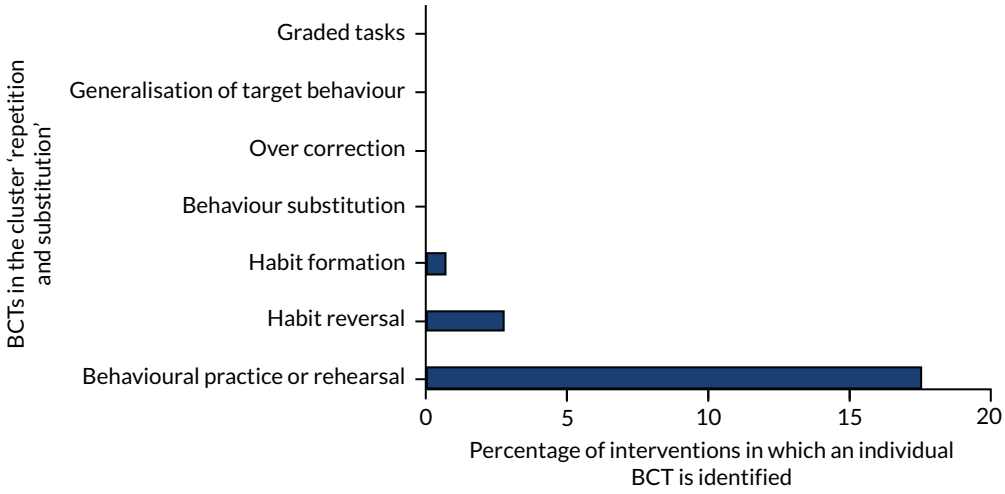

FIGURE 19 Behaviour change technique cluster 8: repetition and substitution.

There was little content in the interventions relating to habit, although one habit formation (BCT 8.3) technique was identified in *Safewards*, the requirement that staff:

> *. . . say something good about each patient at nursing shift handover . . .*
>
> *Bowers* et al.[16]

There was one example of 'habit reversal' (BCT 8.4), used within four interventions,[16,159,213,222] that encouraged staff to break the habit of saying 'no' to service user requests:

> *This has led to a culture of 'say yes first' at the trust, which helps patients to understand what needs to happen for a member of staff to say 'yes'. The 'reflect' acronym helps staff to remember what they need to consider when answering a patient's request: R – Reframe: What would it have taken to say yes? E – Easy: Was 'no' the easy option? F – Feeling: What would it have felt like? L – Listen: Did we listen? E – Explain: Did we explain? C – Creative: Were we creative enough? T – Time: Did we take the time?*
>
> *East London NHS Foundation Trust, 2017.[85] Contains public sector information licensed under the Open Government Licence v3.0*

> *First reflex should be saying 'yes', not 'no'. Do you really need to say 'no'? Can you justify saying 'no'? Is this something that with a bit of effort or work or checking, you could say 'yes' or at least a partial 'yes' to?*
>
> Safewards[213]

Comparison of outcomes

As seen in *Figure 20*, cluster 9, 'comparison of outcomes', contained 2% of the BCTs with only one detected from the three within this cluster. 'Pros and cons' (BCT 9.2) and 'comparative imagining of future outcomes' (BCT 9.3) were not identified. The only BCT in this cluster was that of using a 'credible source' (BCT 9.1), usually as a way of imparting information. A variety of these credible sources were described within the interventions. Service users were used in 13 interventions:

> *When staff began to accept peers as co-workers and began to rely on them as a crucial part of the workforce, attitudes toward recovery changed significantly, and the tendency to use seclusion and restraint became more and more remote.*
>
> *Ashcraft and Anthony*[193]

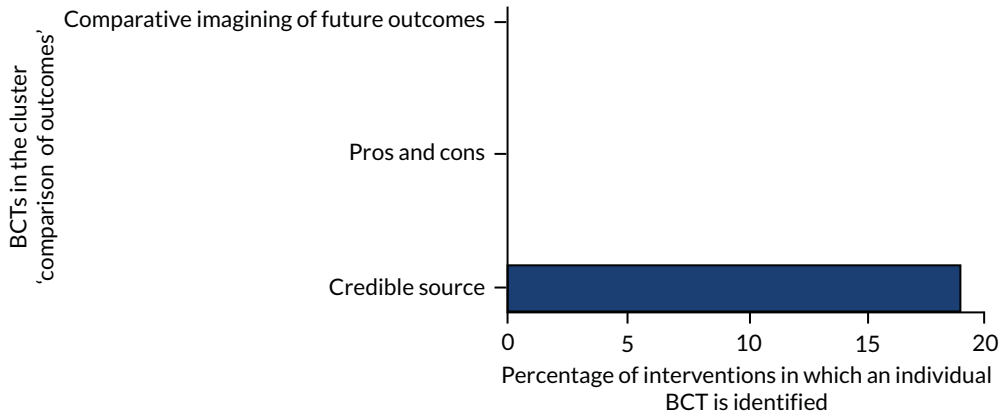

FIGURE 20 Behaviour change technique cluster 9: comparison of outcomes.

The psychological impact of restrictive practices was described by service users as part of training or other awareness-raising activities, this was also coded as 'salience of consequences' (BCT 5.2):

> *At the engagement sessions, delivered in partnership with service users, teams are introduced to No Force First and hear accounts of people's experience of physical intervention.*
>
> *Riley* et al.[134]

Clinical specialists were also described as credible sources in other interventions, either delivering training or describing the physical impact of restraint on the service user (e.g. a medical director in Madan *et al.*[108]). One other type of credible source was academic researchers feeding back intervention data to ward staff (e.g. Mann-Poll *et al.*[212]).

Reward and threat

As illustrated in *Figure 21*, cluster 10 ('reward and threat') contained 4 of the 11 possible BCTs. Future punishment, self-reward/incentive, non-specific reward/incentive and material reward/incentive (behaviour) were not detected. Two per cent of BCTs were in this cluster. Incentives and rewards could be 'non-specific' (BCT 10.6, BCT 10.3), 'material' (BCT 10.1, BCT 10.2) or 'social' (BCT 10.5, BCT 10.4). There could also be 'self-incentive' (BCT 10.7) and 'self-reward' (BCT 10.9), and could also be associated with 'behaviour or outcome' (BCT 10.8, BCT 10.10).

Most of the incentive and reward described within the interventions was of the social variety (BCT 10.4, BCT 10.5). In some interventions, wards or individuals were praised for reducing restrictive practices (e.g. Szypula and Martin[89]) through awarding certificates, celebrations of success, favourable publicity in service newsletters, and notice boards where positive messages can be left. For instance, a board in a staff office was used for staff to write supportive messages and compliments about the good work they were doing; this proved popular and eventually transferred into the patient area so that both patients and staff could write on it.[83]

Blair and Moulton-Adelman[222] reported the following:

> *Ongoing recognition of unit successes and individual staff initiatives related to improved patient care is encouraged. Such steps reinforce positive movement toward a therapeutic culture of care and improve overall morale and cohesiveness.*
>
> *Blair and Moulton-Adelman*[222]

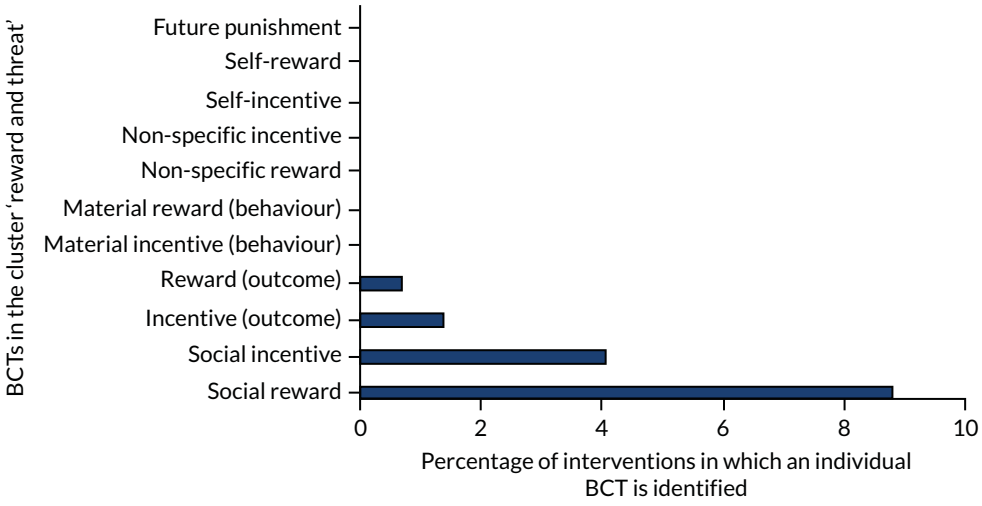

FIGURE 21 Behaviour change technique cluster 10: reward and threat.

Blair and Moulton-Adelman[222] describe that success is acknowledged in many ways, including recognition of individuals in staff meetings, department-wide e-mails, and get-togethers organised across the unit for the purpose of celebrating the achievement of specific milestones. The celebrations help to reinforce awareness of the goals yet to be reached.[222]

'Material incentives and rewards' (BCT 10.1, BCT 10.2) were few, although one intervention had a competition with a prize for the best performing ward, and cinema tickets were raffled among ward staff.[237] Continuing professional development (CPD) credits were used in one intervention as an incentive for attending training.[115]

Regulation

Very few of the interventions used BCTs from the cluster 'regulation' (0.6%) and only one of the four possible BCTs was identified. As illustrated in *Figure 22*, 'pharmacological support' (BCT 11.1), 'conserving mental resources' (BCT 11.3) and 'paradoxical instructions' (BCT 11.4) were not identified. The only BCT detected in this cluster was 'reduce negative emotions' (BCT 11.2), which was targeted at reducing staff stress in order to promote the reduction of restrictive practices. Several interventions ($n = 8$) described a focus on reducing staff stress in general terms, although some addressed specific aspects of staff stress including anxiety,[141] frustration[236] or burnout:[70]

> *The strategy of allowing people to vent about possible negative outcomes was needed to create space for possibilities.*
>
> *Ashcraft* et al.[24]

Other studies focused on reducing staff negative emotions during the post-incident debrief:

> *Opportunities are provided/scheduled to process the event with staff about their feelings, reactions, and safety.*
>
> *Colton*[176]

Scheduled consequences

Few aspects of cluster 14, 'scheduled consequences' (reward and punishment), were used in the interventions, with only 0.3% of BCTs being in this cluster and only one BCT identified: 'remove punishment' (BCT 14.10). 'Behaviour cost' (BCT 14.1), 'punishment' (BCT 14.2), 'remove reward' (BCT 14.3), 'reward approximation' (BCT 14.4), 'rewarding completion' (BCT 14.5), 'situation-specific reward' (BCT 14.6), 'reward incompatible behaviour' (BCT 14.7), 'reward alternative behaviour' (BCT 14.8) and 'reduce reward frequency' (BCT 14.9) were not identified (*Figure 23*).

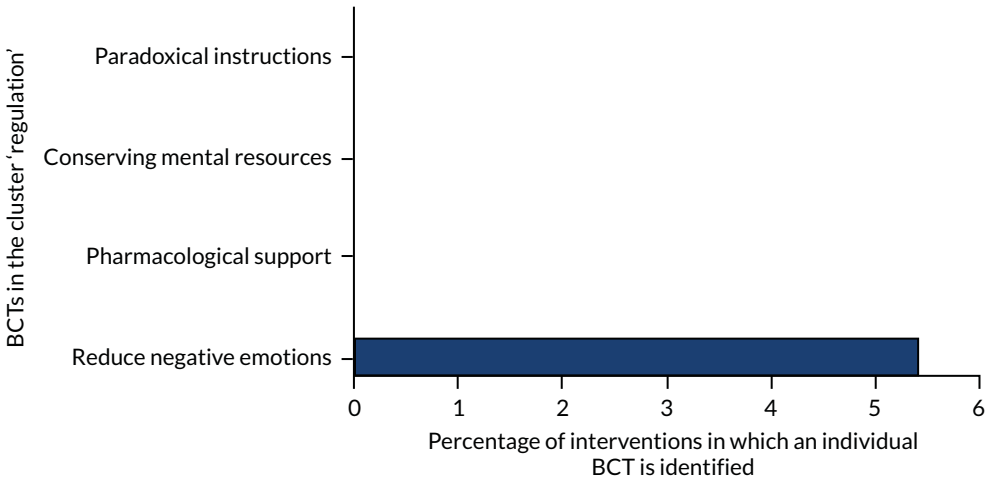

FIGURE 22 Behaviour change technique cluster 11: regulation.

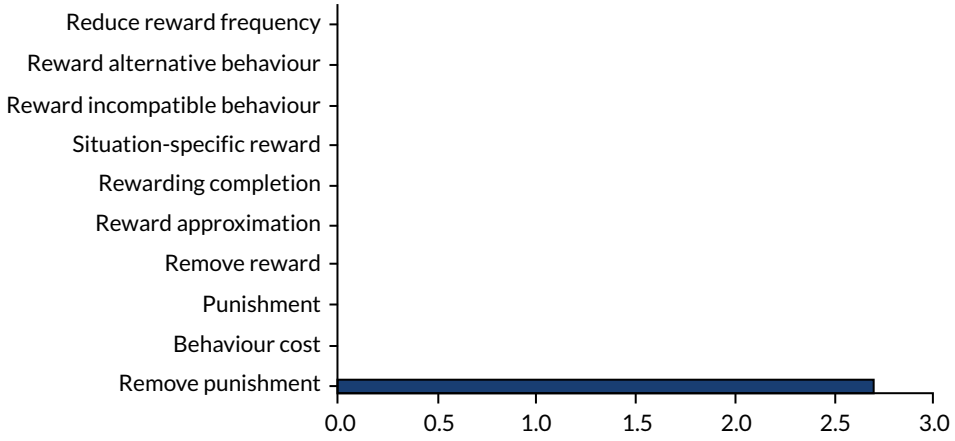

FIGURE 23 Behaviour change technique cluster 14: scheduled consequences.

The removal of punishment referred to the removal of an unpleasant consequence if the desired behaviour is performed. In five interventions,[132,133,159,238,239] this was described as ensuring that debriefing sessions were supportive and not blaming to promote reflection on attempted de-escalation from the staff members involved, even if the episode had resulted in the use of a restrictive practice:

> *There was a focus on performance, but the approach was one of curiosity and help rather than summative judgement.*
>
> *Lombardo* et al.[159]

> *Administrators have carefully fostered a welcoming, nonthreatening atmosphere that helps direct care staff overcome their initial trepidation about attending the meetings in the medical director's office. Leaders have purposefully avoided any appearance of assigning blame or 'second guessing' decisions that have been made by direct care staff.*
>
> *Allen* et al.[238]

Unused or little used behaviour change technique clusters in interventions

Two clusters of BCTs, 'self-belief' and 'covert learning', were not detected in any of the interventions (*Box 1*). The 'self-belief' category contains techniques that aim to promote self-efficacy, a determinant that has a key role in reducing lapses and coping with behavioural barriers.[240]

Some clusters featured only by virtue of one BCT being coded (coded BCT in bold) (*Box 2*).

As illustrated in *Box 2*, there were two little-used BCT clusters: 'regulation' and 'scheduled consequences'. Within these, 'reduce negative emotions' (highlighted in italics in *Box 2*) was coded in relation to stress reduction elements of an intervention, and 'remove punishment' (highlighted in italics in *Box 2*) referred to ensuring that, when de-escalation had failed and restrictive practices had been used, the staff member could debrief reflexively on what could have been done differently, rather than in anticipation of punishment.

It should be noted that, for a BCT to be identified in an intervention, there had to be evidence of its presence within the intervention materials. Therefore, there may be instances where a BCT remained unidentified owing to lack of evidence. See *Appendix 14* for a full list of the BCTs that were not identified in the interventions.

BOX 1 Behaviour change technique not detected

Unused behaviour change techniques

15. Self-belief

15.1. Verbal persuasion about capability.

15.2. Mental rehearsal of successful performance.

15.3. Focus on past success.

15.4. Self-talk.

16. Covert learning

16.1. Imaginary punishment.

16.2. Imaginary reward.

16.3. Vicarious consequences.

BOX 2 Infrequently coded behaviour change techniques

Little-used behaviour change techniques

11. Regulation

11.1. Pharmacological support.

11.2. *Reduce negative emotions.*

11.3. Conserving mental resources.

11.4. Paradoxical instructions.

14. Scheduled consequences

14.1. Behaviour cost.

14.2. Punishment.

14.3. Remove reward.

14.4. Reward approximation.

14.5. Rewarding completion.

14.6. Situation-specific reward.

14.7. Reward incompatible behaviour.

14.8. Reward alternative behaviour.

14.9. Reduce reward frequency.

14.10. *Remove punishment.*

Mechanisms of action

In behavioural science, mechanisms of action are posited as the theoretical constructs through which BCTs affect behaviour. Recent work has specified 26 mechanisms of action, drawn from the Theoretical Domains Framework[241] and a systematic review of 83 behaviour change theories.[242] Understanding how specific BCTs have their effects on behaviour will help us to explain intervention effects and to evaluate interventions and, as evidence accumulates, potentially help us to develop more effective and/or efficient interventions. The Theory and Techniques Tool[243] was used to identify the mechanisms of action for which there were identified links with the BCTs identified in studies reporting positive findings.

The BCTs that were used in studies reporting positive findings are shown in relation to their established links with mechanisms of action (*Table 9*). This shows that the most common mechanisms of action linked to BCTs in studies reporting successful findings were 'environmental context and resources' and 'behavioural cueing'. 'Environmental context and resources' is defined as changes to aspects of a person's situation or environment that discourage or encourage the behaviour (in this case de-escalation). BCTs linked with this were 'restructuring the social environment' (BCT 12.2), for example introducing social contact with service users; 'prompts or cues' (BCT 7.1), such as completing a daily risk assessment'; 'restructuring the physical environment' (BCT 12.1), perhaps by removing a seclusion room; and 'adding objects to the environment' (BCT 12.5), for example adding a sensory cart to a ward. 'Behavioural cueing' indicates processes by which behaviour is triggered from the external environment, from the performance of another behaviour or from ideas appearing in consciousness. The BCTs that used 'behavioural cueing' included 'adding objects' such as posters, 'prompts' such as risk assessment or flow charts, 'action-planning' through care-planning or team meetings, and 'changes to the physical environment', for example the introduction of a sensory room.

The second most common was that of 'behavioural cueing': processes by which behaviour is triggered from the external environment, the performance of another behaviour, or from ideas appearing in consciousness. The BCTs that used 'behavioural cueing' included 'adding objects to the environment', such as posters, 'prompts or cues' such as risk assessment or flow charts, and 'action-planning' through care-planning or team meetings as well as 'changes to the physical environment', such as the introduction of a sensory room.

The 'knowledge' mechanism of action was targeted by two BCTs. The first was 'instruction of how to perform the behaviour' (BCT 4.1), which was coded whenever training in effective de-escalation was present. 'Information about antecedents' (BCT 4.2) included education about what kind of factors often lead to incidents, at either an individual or a ward level.

Behavioural regulation was also targeted by the BCTs 'information about antecedents' (BCT 4.2) and 'problem-solving' (BCT 1.2), which could include discussion with an individual service user about how staff could behave towards them to ensure that incidents involving restrictive practice were avoided. This could also include discussion within staff teams, sometimes in the form of a safety huddle, where the overall needs of the ward were discussed and resources reallocated to avoid incidents developing.

Skill was targeted by 'instruction on how to perform behaviour' (BCT 4.1), in which staff were taught specific skills related to de-escalation, for example non-confrontational verbal approaches. Feedback processes were targeted by 'feedback on outcomes of behaviour' (BCT 2.7); this commonly involved wards receiving a weekly summary of how many incidents of restrictive practices had occurred. Attitude towards the behaviour was targeted by 'framing/reframing' (BCT 13.2). An example of this was when *Trauma-Informed Care* approaches were introduced to a service and staff were encouraged to view the use of restrictive practices as retraumatising, rather than as a necessary part of clinical work. Memory, attention and decision processes were targeted by 'prompts or cues' (BCT 7.1), such as carrying out a risk assessment as part of each admission.

TABLE 9 Mechanisms of action for BCTs found in studies with significant positive findings

BCT	Mechanisms of action									
	Knowledge	Skill	Belief about capabilities	Behavioural regulation	Behavioural cueing	Feedback processes	Environmental context and resources	Social influences	Memory attention and decision processes	Attitude towards the behaviour
4.1 Instruction on how to perform the behaviour	✗	✗	✗							
12.2 Restructuring the social environment							✗			
1.2 Problem-solving			✗	✗						
1.4 Action-planning					✗					
7.1 Prompts or cues					✗		✗		✗	
13.2 Framing/ reframing										✗
2.7 Feedback on outcome(s) of behaviour						✗				
4.2 Information about antecedents	✗			✗						
12.5 Adding objects to the environment					✗		✗			
12.1 Restructuring the physical environment					✗		✗			

It is worth noting that none of the BCTs in studies that reported significant positive findings targeted optimism, social/professional role and identity, needs, values or emotion. Of these, only emotion has any evidence of links with BCTs and there is only one (BCT 11.2: 'reduce negative emotion'). As such, it may be that there are methods for targeting these mechanisms of action but no connections have so far been made between them and individual BCTs. *Appendix 15* provides further detail regarding the identification of BCTs in evaluations of interventions that reduced restrictive practices.

Conclusion

The results of the application of the BCT taxonomy to 150 interventions that sought to reduce restrictive practices identified 43 out of a possible 93 BCTs within the intervention materials. The most frequently identified BCT was 'instruction on how to perform the behaviour' (BCT 4.1), reflecting the high use of training within interventions. The other most frequently identified BCTs were within the 'goals and planning' cluster, followed by 'shaping knowledge', 'antecedents' and 'feedback and monitoring'. These four clusters contained over two-thirds of the BCTs.

Chapter 6 Results of the behaviour change technique synthesis: behaviour change techniques in intervention procedures

This chapter presents the results of the BCT synthesis. The BCTs found in the interventions are grouped and described here. The full list of records included in the review is provided in *Appendix 16*.

Behaviour change techniques by intervention procedure

Twelve per cent of interventions used only one procedure, with the rest containing multiple procedures, for example staff training and audit and feedback or nursing changes and service user involvement. The BCTs detected in individual procedures were extracted and are detailed below.

Training

As illustrated in *Figure 24*, staff training was the procedure most frequently reported in interventions. The most frequent BCT detected was that of instruction, although that was coded for every training intervention even if no detail was provided. Following instruction, there were numerous other BCTs detected; *Figure 24* shows those featuring in > 10% of interventions. Reframing the beliefs of participants often involved education about *Trauma-Informed Care* or, less frequently, the recovery model. 'Problem-solving' featured within training when participants were asked to consider their own settings and examine what antecedents led to incidents, and 'action-planning' featured where it was decided to make changes to avoid them. 'Restructuring of the social environment' via training might include aspects such as encouraging staff to try to have more contact with service users.

Training often involved staff practising or rehearsing de-escalation by taking part in role play, with each other, with the trainers or even with actors. Feedback on performance could involve social support from peers and trainers. Training was delivered by professional trainers from specific companies, sometimes using a 'train the trainer' model. Other interventions used senior clinical staff to deliver training and external trainers often came from clinical backgrounds. Service users were included in training, delivering information about the consequences of experiencing restrictive practices and increasing the salience of those consequences through telling of their personal experience.

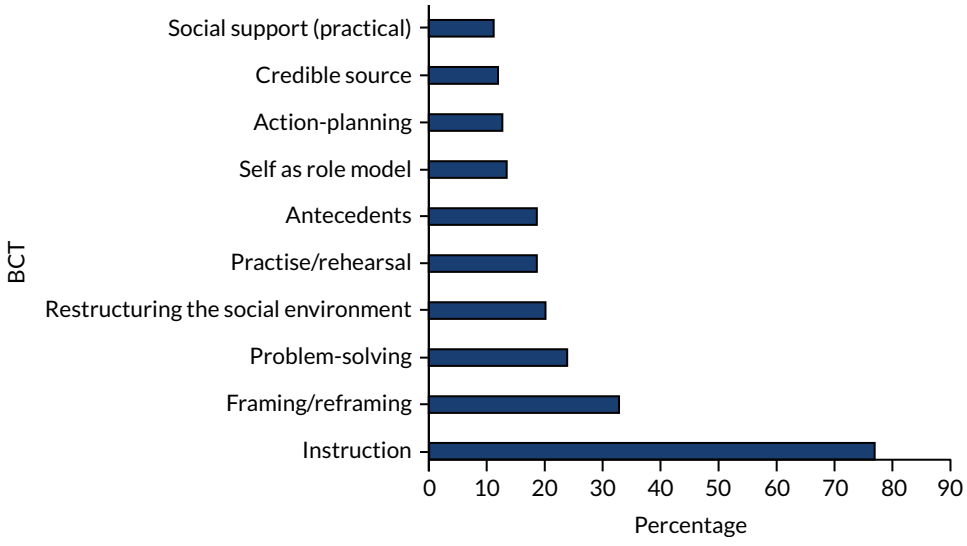

FIGURE 24 Procedures: training: 135 interventions coded.

Some interventions encouraged trainees to see themselves as a role model by taking their learning back to the workplace and sharing it with other staff, as well as leading by example.

Audit and feedback

Audit and feedback are when clinical performance-related data are collected and fed back to health-care staff, and are often available in electronic format. As illustrated in *Figure 25*, the audit and feedback procedures in the interventions typically consisted of data being collected from ward staff about any restrictive practices that occurred on the ward. These data might be the number of restraints or seclusion, the duration of seclusion or the use of PRN medication. Data are often entered by ward staff onto a centralised system. A number of different variables affected how the data were fed back to staff teams. The frequency of feedback was variable and could be daily, weekly, monthly or quarterly. The level of detail varied in terms of whether it was ward- or service-level data. The means of feedback could be in person or electronically, to an individual or a team. Data could be made public or retained within the staff team. No data were fed back at individual staff level. The resulting discussion about the data could involve problem-solving and action-planning, particularly if the rates of restrictive practice had not decreased in line with goals. Practical social support was evident here with staff making suggestions and supporting each other, and celebrating successes, a type of social reward. Some wards self-monitored their rates of restrictive practices, perhaps collecting more detail than would be collected by central incident reporting systems, for example about antecedents. Comparison to others might feature if wards were comparing their rates with other wards. Some interventions also monitored outcomes without feeding them back to staff.

Nursing changes

As illustrated in *Figure 26*, the BCT detected most frequently in these interventions was 'restructuring the social environment'. This often occurred through making staff more accessible and proactive to service user need as well as introducing new meetings to discuss ward safety (e.g. safety huddles), maybe with a regular prompt, often involving the ward staff monitoring their behaviour and providing each other with social support both practical and emotional. 'Problem-solving and action-planning' was carried out at individual and ward level with the overall milieu of the ward being the focus or individuals who might be experiencing distress. The underlying philosophy of care might be changed by adopting an approach such as *Trauma-Informed Care* or the recovery model. In these cases, 'reframing' would be used to change the beliefs of staff to view distress in a different way. Such approaches might encourage staff to see themselves as role models practising the new approach with service users and supporting other staff. Sometimes physical changes were made to service settings to make them more comfortable, or to include quiet areas: objects could be added such as exercise equipment or books and multimedia devices.

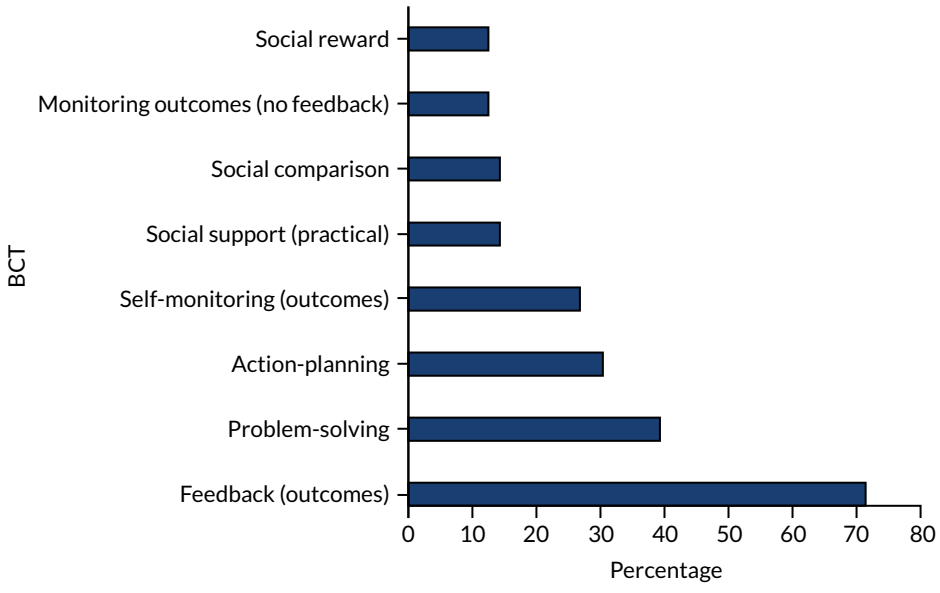

FIGURE 25 Procedures: audit and feedback: 53 interventions coded.

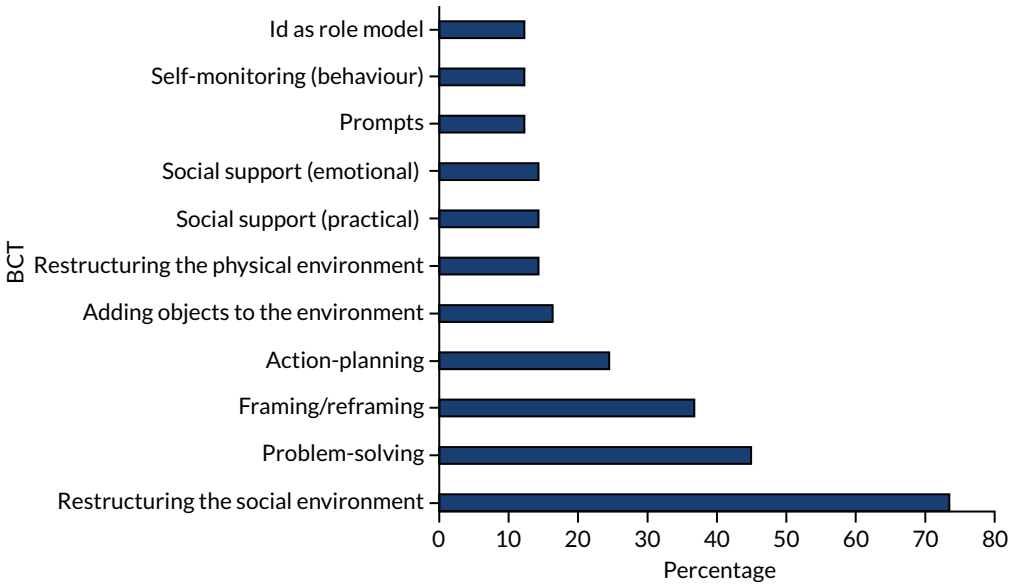

FIGURE 26 Procedures: nursing changes: 48 interventions coded.

Service user involvement

As illustrated in *Figure 27*, the BCTs that were present with service user involvement were predominantly 'restructuring the social environment', ensuring that service users informed the development of interventions or parts of interventions. Service user committees were used for a variety of reasons including the ongoing monitoring of the behaviour of ward staff, reviewing the rates of restrictive practices and contributing towards problem-solving. Service users were part of delivering training, as a credible source testifying about the harms of restrictive practices, and were sometimes employed to provide staff with mentoring.

Care planning

As seen in *Figure 28*, care planning was one procedure used to reduce restrictive practices, primarily by attempting to problem-solve, by relating to service users' needs while they were resident in a setting. The planning was frequently prompted by an admission, or might be carried out weekly with staff having a discussion with the service user about their current situation and/or previous experiences. It often included soliciting information about what 'antecedents' could cause distress and how they can be avoided. If a new method of care planning was introduced as part of the intervention, perhaps by placing greater value on service user perspectives, this might also be 'restructuring the social environment'.

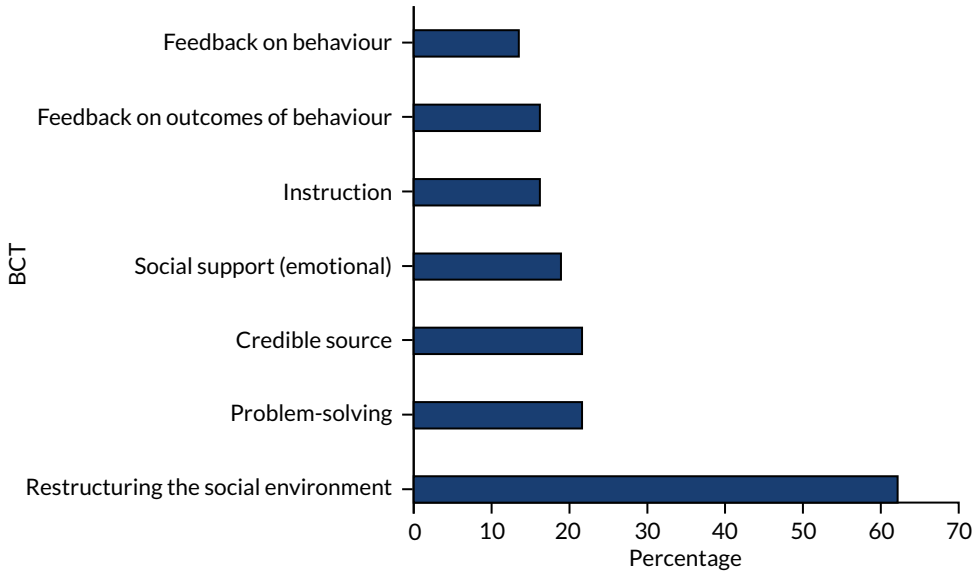

FIGURE 27 Procedures: service user involvement: 37 interventions coded.

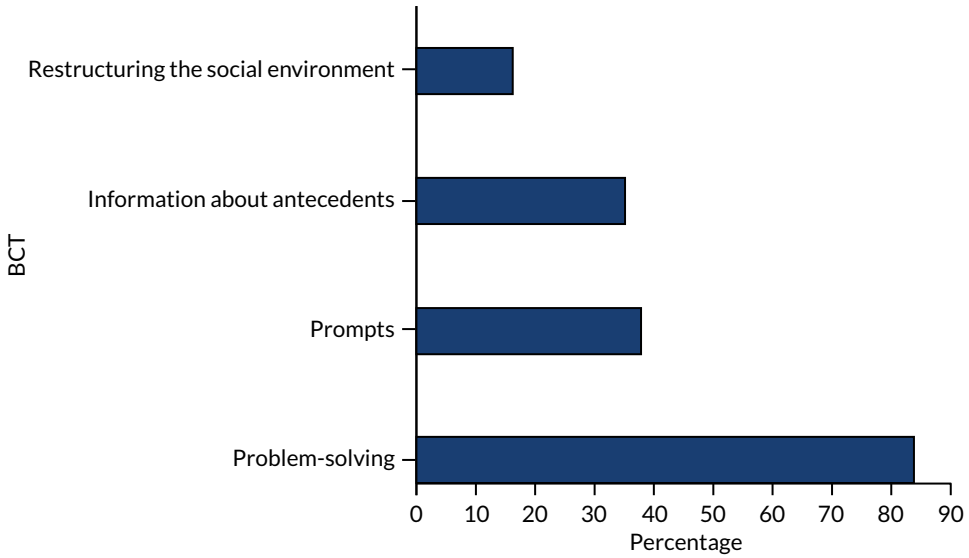

FIGURE 28 Procedures: care planning: 37 interventions coded.

Communication strategies

As illustrated in *Figure 29*, procedures to improve communication focused on restructuring the social environment, often by introducing new fora for examining current behaviour and then problem-solving and action-planning with the provision of social support, sometimes involving service users.

Procedures could add objects to support communication, for example a wall calendar allowing service users to book appointments with a doctor if they wished. These procedures were often informed by framing/reframing approaches such as *Trauma-Informed Care* and promoting service user involvement.

Debriefing

As illustrated in *Figure 30*, debriefing typically took place within a few hours of an incident of restraint. Debriefing after an incident when restrictive practices were used was an opportunity for both staff and service users to reflect on what happened (What antecedents had led up to the incident? What specific problems had arisen? Why had they not been solved? What could have been done differently? What would reduce the chances of the same thing happening again?) and its introduction was coded as a restructuring of the social environment. This involved problem-solving, action-planning and examining

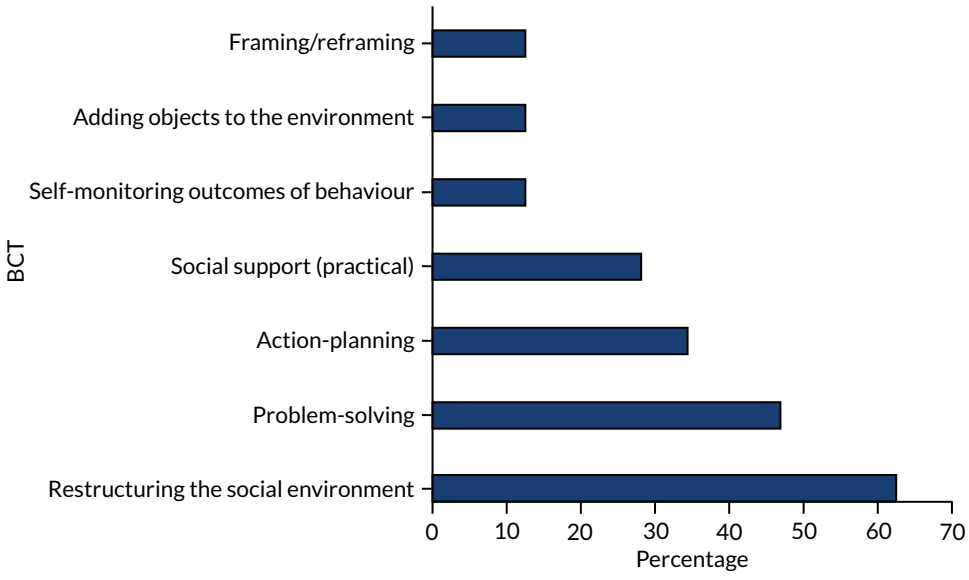

FIGURE 29 Procedures: communication: 32 interventions coded.

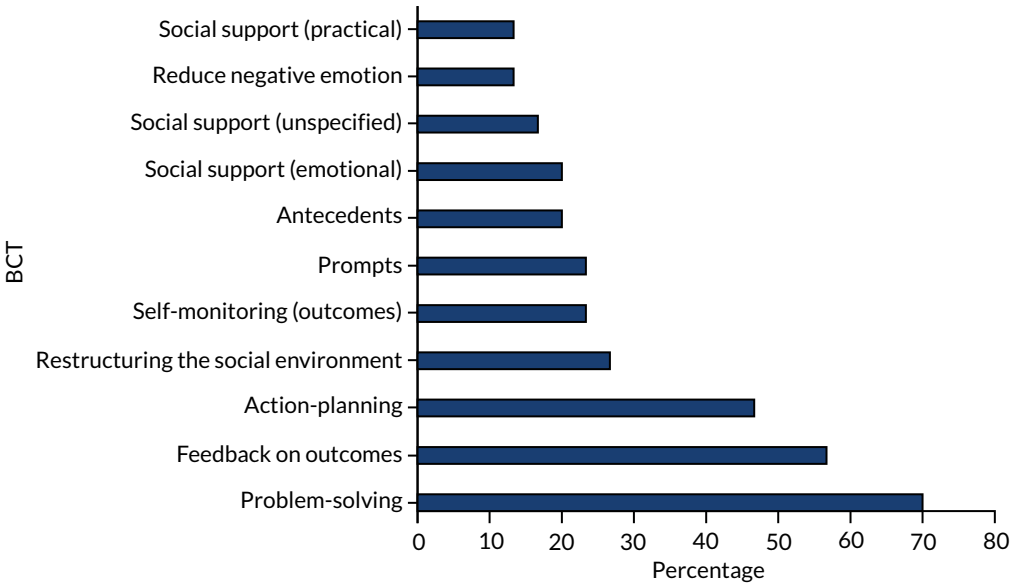

FIGURE 30 Procedures: debriefing: 30 interventions coded.

antecedents as well as receiving feedback on outcomes of the incident. The debrief was usually framed in positive terms so that staff did not feel that it was a form of punishment, rather an opportunity to reflect on what had happened and examine their behaviour. Debriefs involved a range of different people; they sometimes included only the staff member(s) involved but at other times included the service user, members of the broader staff team and senior managerial staff. One feature was the provision of social support, both practical and emotional.

Sensory approaches

As illustrated in *Figure 31*, sensory procedures almost always included the addition of objects to the environment, usually sensory modulating equipment, available for service users to use on a ward. Some interventions restructured the physical environment by adding dedicated *Sensory Rooms*, quiet areas or even gardens. Assessments on admission for sensory preferences might become prompts to ensure that these facilities were tailored to the individual service user and involved problem-solving and action-planning.

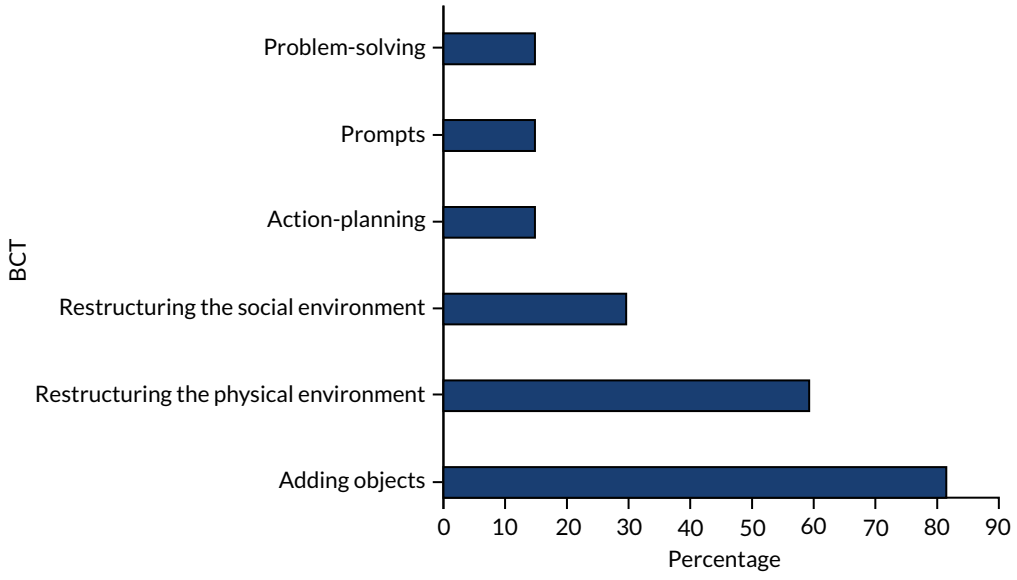

FIGURE 31 Procedures: sensory: 27 interventions coded.

Policy change

Procedures that involved a change of policy or rules restructured the social environment (*Figure 32*). Some also involved framing/reframing such as adopting a recovery approach, social support through restructuring meetings, prompts to carry out regular risk assessments, and problem-solving and goal-setting often through meetings. Objects added to the environment included posters displaying information about service rules.

Risk assessment

As illustrated in *Figure 33*, the procedures for risk assessment were similar to care planning but focused on risk and safety. The most common BCT was the staff member identifying antecedents, problem-solving and action-planning with or about the service user. As with more general care planning, risk assessment was often prompted on admission to services or was carried out on a regular basis. This change in practice could sometimes be part of a broader change in the social environment.

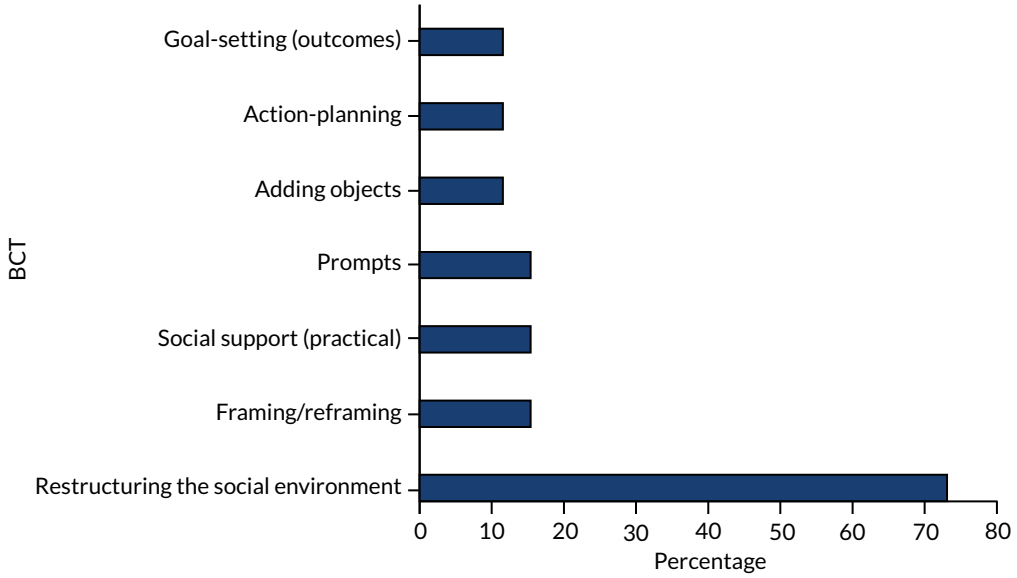

FIGURE 32 Procedures: policy: 26 interventions coded.

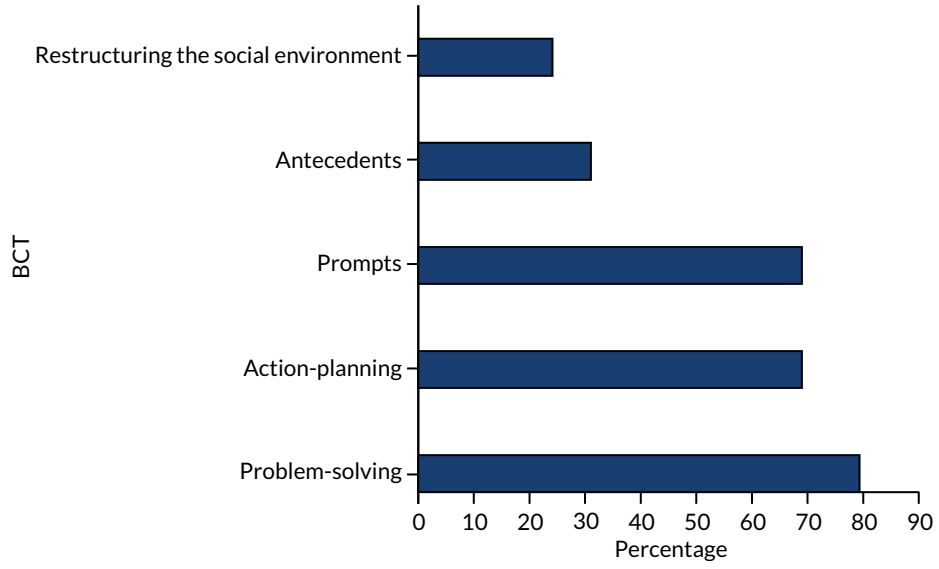

FIGURE 33 Procedures: risk assessment: 29 interventions coded.

Enhanced leadership

Procedures to enhance leadership were dominated by changes in the social environment (*Figure 34*), sometimes involving a wholesale adoption of an approach such as *Trauma-Informed Care*. These procedures included more contact with ward staff, the formation of project steering groups reviewing both behaviour and outcomes, and managers working on wards and being seen as role models in the attempts to reduce restrictive practices. Other aspects often informed through these mechanisms were problem-solving, action-planning and goal-setting for both behaviour and outcomes.

Role modelling

As illustrated in *Figure 35*, the development of staff as role models involved them self-identifying as a role model, operating as such within the staff team, predominantly by providing social support to their colleagues. The use of role models often involved restructuring the social environment in terms of introducing new staff who were the role models, or training existing staff to fulfil this position.

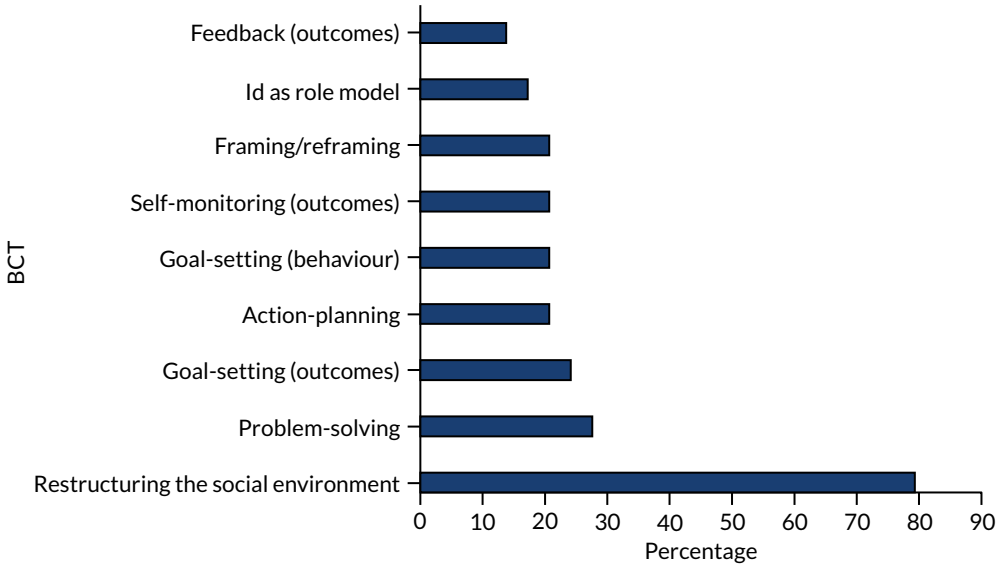

FIGURE 34 Procedures: enhanced leadership: 29 interventions coded.

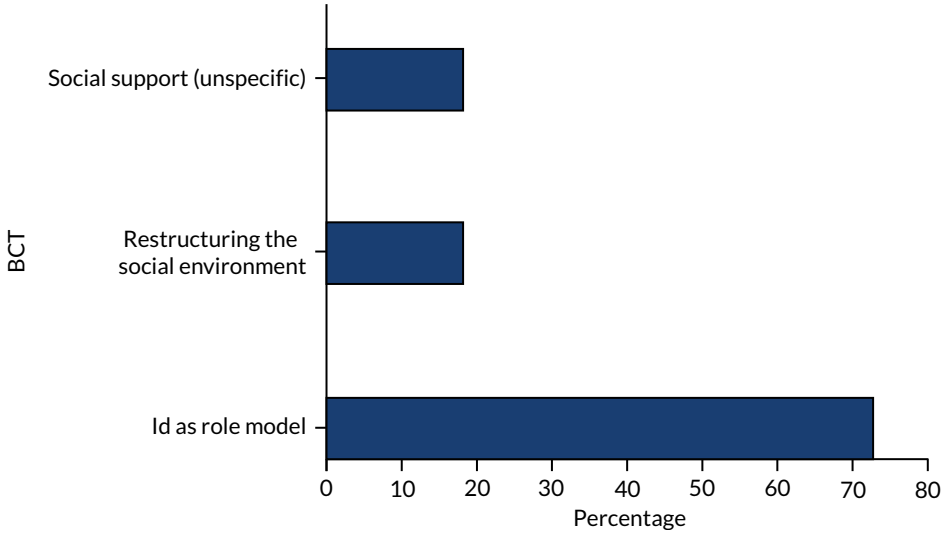

FIGURE 35 Procedures: role models: 11 interventions coded.

Increased staffing

Increased staffing was rarely associated with any other BCT other than restructuring the social environment, coded in 91% ($n = 11/12$) of the interventions.

Activities for service users

As illustrated in *Figure 36*, few BCTs were detected in relation to the introduction of activities for service users. These changed the social environment to reduce the use of restrictive practices by improving the options open for staff when working with service users. They could include adding objects to the environment, such as sports equipment or games consoles.

Rapid response teams

Several interventions ($n = 8$) made use of rapid response teams although few BCTs were detected within these descriptions. The availability of teams restructured the social environment of the ward and included staff of varying professional backgrounds, including nursing and security staff who had received instruction in de-escalation. On arrival they provided practical, social support to ward staff; there were also elements of problem-solving and action-planning detected in two of them.

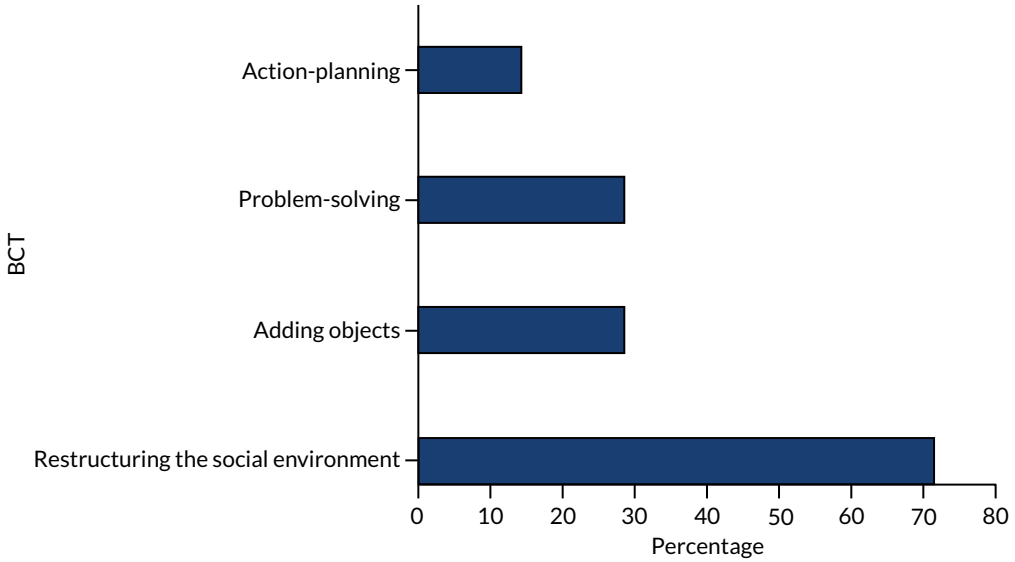

FIGURE 36 Procedures: activities: seven interventions coded.

Chapter 7 Behaviour change techniques and evaluation outcomes

Objective 3 of the study was to identify and prioritise BCTs showing most promise of effectiveness and that require testing in future high-quality evaluations. Ninety-six of the interventions coded for BCTs had been evaluated on 109 occasions using a range of outcome measures namely, restraint (duration and incidence), seclusion (duration and incidence), PRN medication use, observation, or multiple measures reported in combination so that it was not possible to disaggregate them (see *Appendix 13*). Ninety per cent of evaluations reported at least one positive finding, although not all of the evaluations reported statistics to indicate whether or not their findings had statistical significance, with only 58 studies reporting tests of significance. Only one study reported a statistically significant increase in restrictive practices,[129] six reported no effect[69,101,102,145,192,231] and the remainder reported at least one significant positive outcome. *Figure 37* illustrates the BCTs used in studies that reported statistically significant positive outcomes. These were:

- social support (practical)
- restructuring the physical environment
- adding objects to the environment
- information about antecedents
- feedback on outcome(s) of behaviour
- framing/reframing perspective on behaviour
- prompts or cues
- action-planning
- problem-solving
- restructuring the social environment
- instruction on how to perform the behaviour.

This order is different from the frequency with which BCTs are found across all the interventions, as can be seen in *Table 10*.

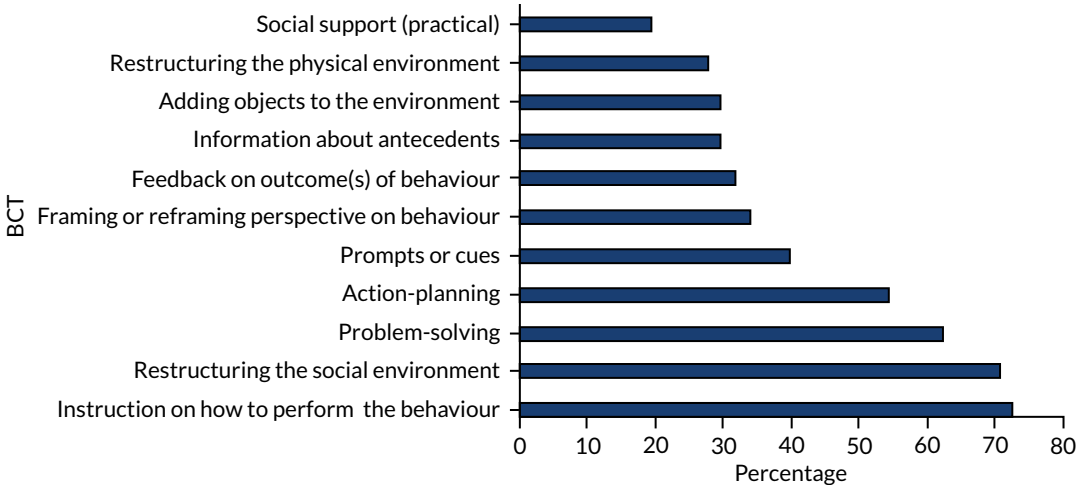

FIGURE 37 Behaviour change techniques identified in studies reporting statistically significant positive findings.

TABLE 10 Behaviour change techniques in all interventions and evaluations reporting significant findings, in ranked order

Number	All interventions	Evaluations of interventions with statistically significant positive findings
1	Instruction on how to perform the behaviour	Instruction on how to perform the behaviour
2	Problem-solving	Restructuring the social environment
3	Restructuring the social environment	Problem-solving
4	Action-planning	Action-planning
5	Framing/reframing	Prompts
6	Antecedents	Framing
7	Prompts	Feedback on outcomes
8	Feedback on outcomes of behaviour	Antecedents
9	Social support (practical)	Adding objects to the environment
10	Adding objects to the environment	Restructuring the physical environment

Behaviour change techniques reporting significant findings in reductions in restraint, seclusion and pro re nata medication

Interventions reported outcomes related to restrictive practices, namely seclusion, restraint, PRN medication, observation and a combination of these that could not be disaggregated (see *Chapter 3*). *Figures 38–40* show the different BCTs identified in interventions that reported significant findings in reductions in PRN medication, restraint and seclusion.

The majority of all interventions looking at the reduction of seclusion and restraint used 'instruction', 'problem-solving', 'action-planning' and 'restructuring of the social environment'. 'Prompts' were used more often in reducing seclusion, and 'restructuring the physical environment,' and 'feedback on outcomes of behaviour' were used more in reducing restraint. A higher percentage of the interventions that reduced PRN use used 'reframing'.

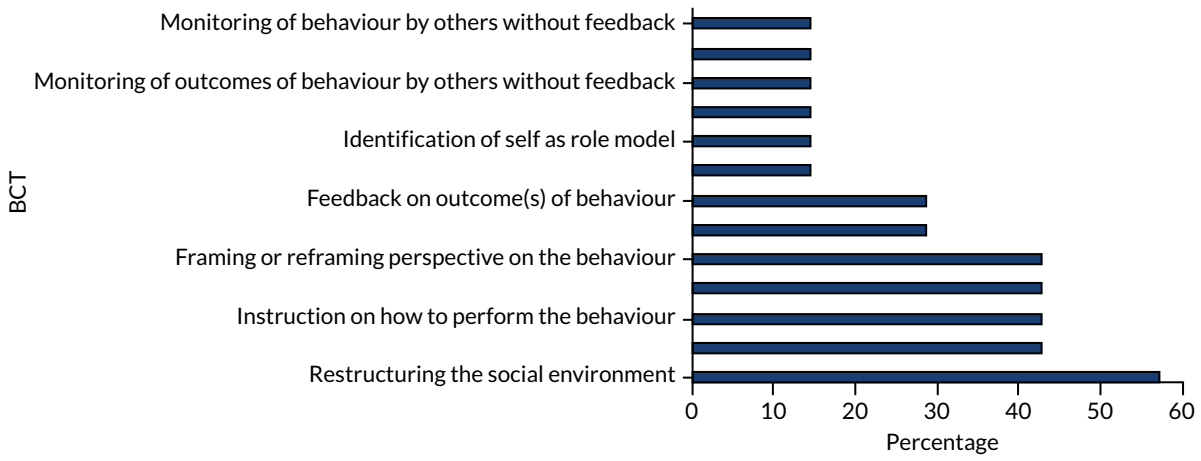

FIGURE 38 All BCTs found in evaluations that reduced PRN medication.

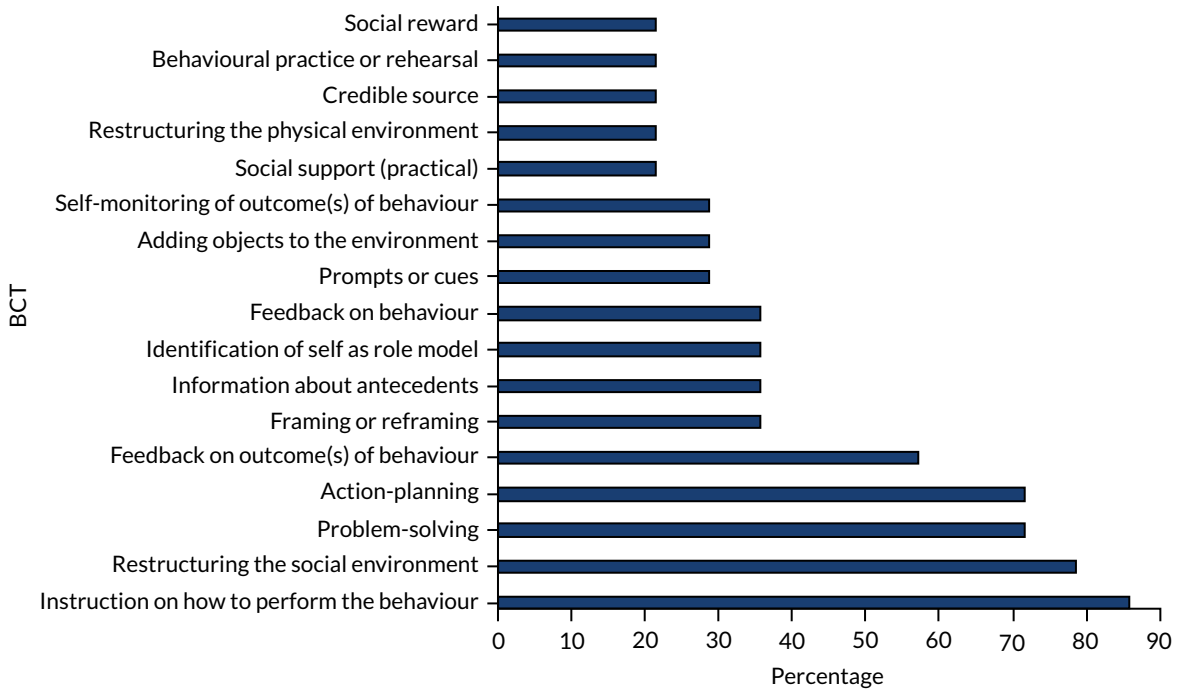

FIGURE 39 Behaviour change techniques found in > 20% of evaluations that reduced restraint.

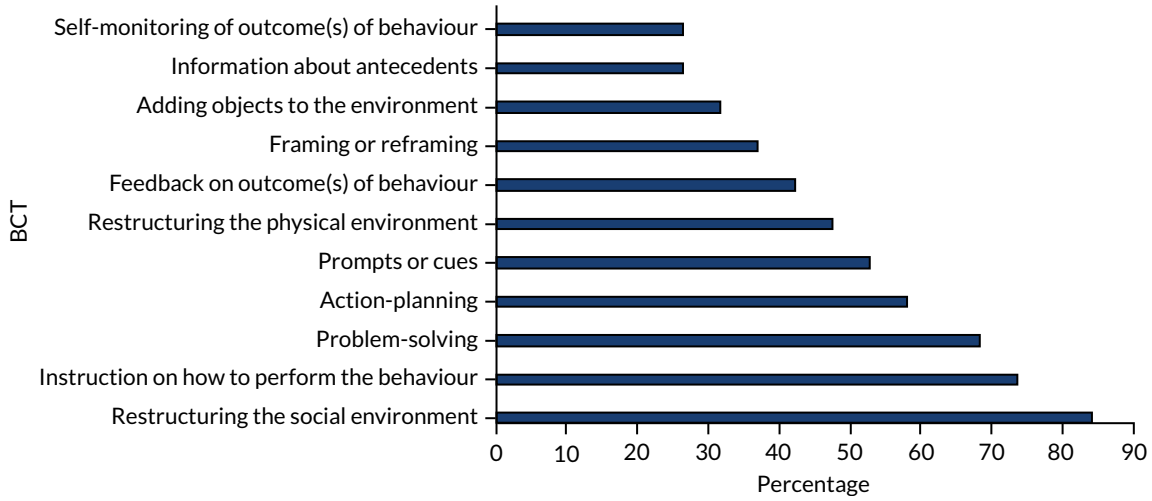

FIGURE 40 Behaviour change techniques found in > 20% of evaluations that reduced seclusion.

Outcomes of randomised controlled trials

As the evaluations were of varied quality it was of interest to look only at the evidence from the five RCTs that reported outcomes, as illustrated in *Figure 41*. All reported at least one significantly positive outcome.

Twelve studies reported no positive findings. The BCTs identified as having been used in these 12 studies are shown in *Figure 42*. 'Instruction', 'action-planning' and 'problem-solving' remain the most popular BCTs in common with all the studies taken as a whole, whereas 'restructuring the social environment' is less common and the use of prompts becomes more frequent, albeit still in only a small number of studies.

FIGURE 41 Behaviour change techniques used in RCTs.

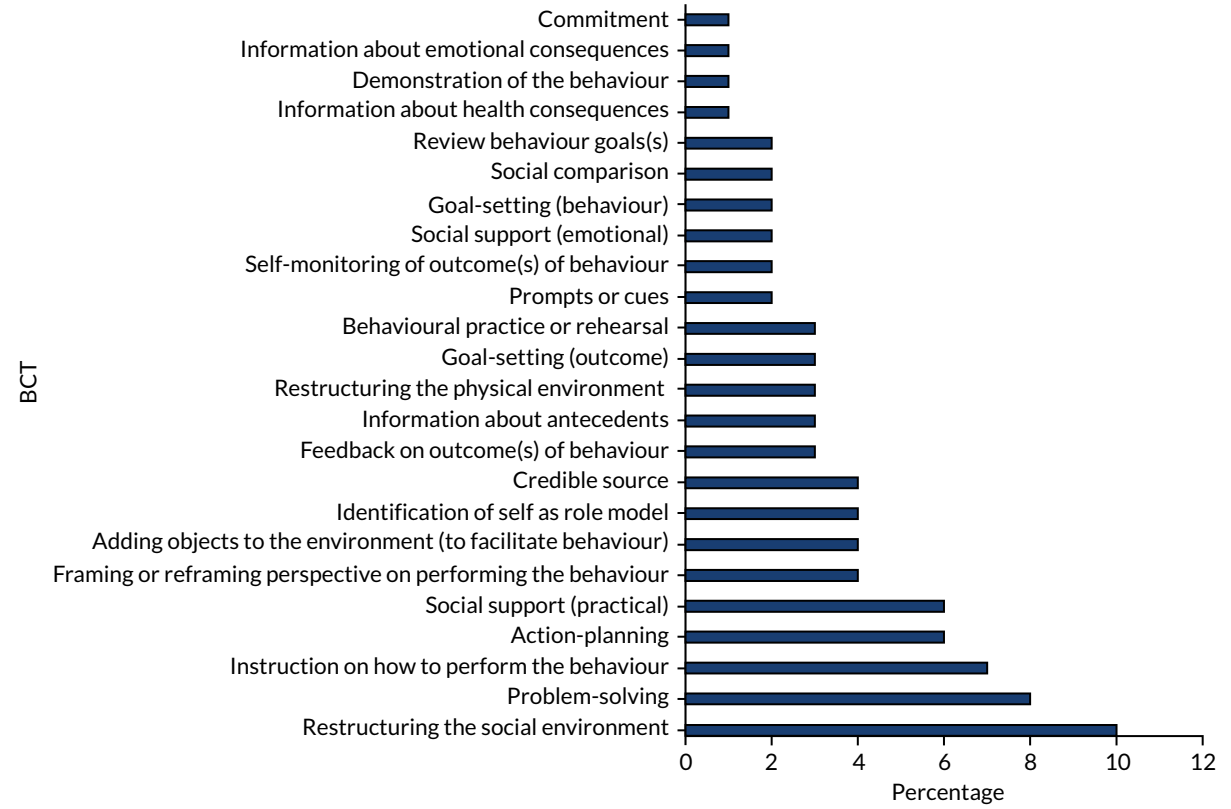

FIGURE 42 Behaviour change techniques of studies showing no positive outcomes.

'Instruction' remains the most commonly identified BCT. Similarly, 'action-planning' and 'problem-solving' are ranked second and fourth. 'Prompts' are more frequently used, ranking third, compared with seventh across all interventions.

The BCTs used in the RCTs contained some differences to those used in studies with no effects. Although both frequently contained 'instruction on how to perform the behaviour', 'action-planning' and 'problem-solving', these were detected in different frequencies with instruction featuring in 88% of RCTs compared with 58% of studies detecting no effects. The use of 'prompts or cues' and 'information about antecedents' featured more in RCTs; all but one reported at least one positive finding. The most frequently identified BCT in studies that found no effects was 'restructuring the social environment', the least specific BCT applied in this study.

Chapter 8 Summary and discussion of mapping results

This chapter summarises the results of the analysis of our broad and extensive searching of databases and the grey literature that identified 175 records containing 150 unique interventions.

Summary of the literature search results

Overview

The overall purpose of the study was to document the range of interventions developed to reduce restrictive practices, describe their characteristics and identify any overarching patterns. The search identified a disparate and complex collection of interventions in many sources and formats, steadily increasing over the 20-year search period since the introduction of the UK National Service Framework for Mental Health in 1999, and peaking in 2017. Most interventions can be found in research reports published in nursing journals. Various mental health-related and other non-governmental organisations provide resources for service providers in the form of links to training providers and examples of good practice in the reduction of restrictive practices.

Characteristics of interventions

The search found a total of 150 unique interventions to reduce restrictive practices. This included 29 intervention families (interventions with multiple records) and 121 standalone interventions (with only single records). *Six Core Strategies* was the largest intervention family and had been implemented in the broadest range of countries ($n = 6$) and clinical settings ($n = 6$). *Safewards* had also been implemented in multiple countries ($n = 3$) and clinical settings ($n = 2$). The highest numbers of interventions (and widest range) were found in the UK and the USA; others were identified in Canada, Australia, New Zealand, Singapore and several European countries. Most interventions were implemented in unspecified adult mental health inpatient settings, but, where more detail was provided, the most common setting in which to undertake an intervention to reduce restrictive practices was an acute ward.

Variation in intervention reporting

Unsurprisingly, given the broad inclusion criteria and the number of interventions subsequently identified, there was enormous variation in intervention reporting. The interventions were often intended to address multiple restrictive practices and related issues (e.g. service user behaviour, staff skills, quality, safety and adverse consequences) in varying combinations. The most common intervention target was seclusion or restraint; however, 11 interventions targeted PRN medication. Similarly, most interventions used multiple procedures, in some cases as many as 10, and, again, in varying combinations. The most common procedure was *Training*, although *Changes to Nursing Approaches* and *Review of Incident Data* were also often used. Despite the popularity of training as a key procedure, detailed descriptions of the training content and providers were often lacking. The least common procedures were *Rapid Response Teams* and *Activities for Service Users*. Forty-eight interventions reported involving service users in some way, but the type and extent of their involvement varied greatly. In some cases, service users were involved in multiple ways, whereas in others they had limited roles.

One hundred and three out of the 109 evaluations used a non-randomised design and there were just six RCTs; the remainder were qualitative or mixed-methods studies. Just two evaluations reported service user involvement in the evaluation. Seventy of the evaluations reported multiple outcome measures, and these most frequently focused on the incidence of seclusion or restraint; however, there was limited consistency as some noted the timing of incidents and others the severity. Only 18 made any reference to the cost of implementing the intervention or its financial impact.

Discussion of analysis

The study clearly shows that there has been an upturn in publications and research endeavour in this field in recent years. In the UK, at least, this is possibly a response to the publication of the Department of Health and Social Care's response to events at Winterbourne View. Restrictive practices began to attract attention following deaths that occurred during their use, and this increased further when the abuse of patients at Winterbourne View Hospital was documented in 2011.[244]

Nevertheless, regardless of an increase in the volume of the literature, the analysis highlighted gaps and huge inconsistency in study design and units of analysis across both sample size and settings. Reporting was generally poor and inconsistent, despite guidelines such as WIDER,[61] which recognises the need to standardise reporting of complex social interventions aimed at changing behaviour and provides tools to address the issue. One explanation for this is that it is difficult to capture or measure who is exposed to the intervention, for what duration and at what intensity. To some extent, the level and clarity of detail provided were determined by the format of the retrieved record, and the nature of the intervention and its procedures. Although training might be conducive to measurement, many other procedures, including changes to policy, nursing approach or the physical environment, could be described as standalone events or as ongoing. Therefore, notwithstanding the advent of tools such as WIDER, the analysis showed that limitations remain when it comes to measuring fidelity, and dose, of interventions designed to reduce restrictive practices.

Discussion of quality assessment

The evidence base for interventions to reduce restrictive practices appears to be small; only six RCTs were identified, and variations in their targets and outcome measures precluded any meta-analysis. Most evaluations were published in nursing journals of low impact. The evaluation methods themselves were often poorly described and, in particular, lacked detail about the interventions or methodology that had been applied or the theoretical basis for the intervention. Forty-one potentially eligible evaluations of interventions were excluded from the analysis as they did not pass the MMAT screening questions.

Issues of quality and reporting are particularly problematic when trying to provide precise descriptions of interventions subject to evaluation because of the implications for replication and meta-analysis: 'to facilitate replication, further development, and scale-up of the interventions'.[61] This clearly had an impact on the ability to apply the taxonomy, make meaningful comparisons of interventions or undertake a meta-analysis of the results. For those studies identified outside the academic literature, experience suggests that other types of reports/formats cannot be relied on to provide comprehensive details of an intervention.

On balance, the evidence suggests that interventions place greater emphasis on service users' contribution to circumstances that lead to the use of restrictive practices than on the impact that restrictive practices (or their reduction) have on them. Many interventions reported that they sought to improve service user experience by, for example, promoting recovery or providing *Trauma-Informed Care* and included specific aims to improve quality of care, service user experience, a feeling of safety and recovery. Nevertheless, few reported examining service user outcomes such as injury or perception of safety. Although they measured the incidence, and sometimes duration, of restraint or seclusion, they did not report these incidents in terms of their impact on service users. Although service users were sometimes involved in intervention delivery, they were rarely involved in intervention design or evaluation. A good proportion of the interventions that were reported included procedures aimed at changing service user behaviour and engaging service users in identifying their own triggers, strategies and preferences. In contrast, interventions inviting managers and frontline professionals to reflect on their practice required a focus not on their triggers, for example, but instead on understanding service users' histories.

Chapter 9 Summary and discussion of the behaviour change technique results

In this chapter, we summarise and discuss the BCT results, reflecting on the application of the BCT taxonomy and drawing out key issues identified from the synthesis.

Summary of the behaviour change technique synthesis results

The application of the BCT taxonomy to provide descriptions of interventions to reduce restrictive practices in a systematic way is, to our knowledge, the first time such an approach has been taken. This review has identified that over two-thirds of all interventions identified employ strategies to shape knowledge, use goals and planning, provide feedback and monitoring, and address antecedents in order to reduce restrictive practices.

Records relating to the 150 identified interventions were coded for BCTs and contained 43 of the possible 93 BCTs (47%). The number of BCTs identified per intervention ranged from 1 to 33 (mean 8 BCTs). The BCT taxonomy[39] places BCTs into 16 thematic clusters. The 43 BCTs identified in the interventions were contained in 14 of these clusters; BCTs from 'self-belief' and 'covert learning' were not detected. The first four clusters were 'goals and planning', 'shaping knowledge', 'antecedents' and 'feedback and monitoring' and contained over two-thirds of the BCTs.

The BCTs related to 'goals and planning' appeared most frequently, with just over one-fifth (22%) of BCTs identified contained within this category, of which 'problem-solving' (BCT 1.2) and 'action-planning' (BCT 1.4) appeared most frequently. The cluster 'shaping knowledge' contained 16% of the overall BCTs and included those capturing imparting information about 'antecedents' (BCT 4.2) (40%) and 'instruction on performing the behaviour' (BCT 4.1) (90%). The BCT cluster 'antecedents', related to factors that might influence whether or not restrictive practices could be avoided, contained 15% of BCTs. Three BCTs were identified: 'restructuring the physical environment' (BCT 12.1), 'adding objects to the environment' (BCT 12.5) and 'restructuring the social environment' (BCT 12.2). BCT cluster 2, 'feedback and monitoring', accounted for the use of data, accounting for 11% of BCTs. 'Data monitoring and feedback' related primarily to outcomes (reduced restrictive practices) rather than behaviour (de-escalation).

Behaviour change techniques were examined with regard to procedures used in interventions, such as staff training, audit and feedback, or nursing changes. This demonstrated which BCTs were associated with the individual procedures of multiprocedural interventions. The most commonly used procedure was staff training (135 interventions), which was dominated by the use of 'instruction on how to perform the behaviour' (BCT 4.1) (77%) and 'framing/reframing' (BCT 13.2) (33%). 'Audit and feedback' (53 interventions) most frequently contained 'feedback on outcomes of behaviour' (BCT 2.7) (71%) and 'problem-solving' (BCT 1.2) (39%). Nursing changes (48 interventions) used 'restructuring the social environment' (BCT 12.2) (73%) and 'problem-solving' (BCT 1.2) (45%).

The BCTs that were identified most frequently in interventions reporting statistically significant reductions of restrictive practices were 'instruction on how to perform the behaviour' (BCT 4.1), 'restructuring the social environment' (BCT 12.2) and 'problem-solving' (BCT 1.2), within the three clusters of 'antecedents', 'shaping knowledge' and 'goals and planning'.

Shaping knowledge

The majority of interventions used staff training as a mechanism to reduce restrictive practices. The training was usually a procedure of the intervention, for example to improve de-escalation skills, but could also form part of another procedure of the intervention such as training to use a risk assessment tool. Training was most likely to be part of a single-procedure intervention but, as the content was poorly described in many instances, it was not possible to determine the delivery, content, duration and frequency of the training. Training can contain a variety of different BCTs, for example social support, shaping knowledge, information about consequences, demonstration of the behaviour, rehearsal, identity, comparison of outcomes and self-belief. It may be that some of these BCTs are more effective in changing behaviour than others and some might have no discernible effect. Theorising how training might be expected to change behaviour would allow for the selection of some of these BCTs and their subsequent testing.

Goals and planning

The use of goals and planning to reduce restrictive practices included strategic goals and planning at several levels (i.e. individual planning with service users, ward team goals, and at the wider organisational or health system level). It is of interest whether or not health system level goals and planning have as much impact as those generated at ward level and whether or not goals and planning with individual service users is more effective at reducing restrictive practices. Some interventions claimed that those initiatives generated at ward level had greater 'buy-in' from staff, whereas others claimed similar importance of top-down initiation and support. These often occurred simultaneously in the same intervention so were difficult to distinguish. Coding of BCTs found at individual, team and system levels would go some way to address this difficulty, although that was beyond the scope of this study as it sought to describe content overall and via individual procedures. Theorising why using 'goals and planning' employed at these different levels might effect change would allow these effects to be tested in isolation.

Antecedents

The social environment of mental health services was thought to contribute to the use of restrictive practices, and many interventions sought to improve it through the promotion of interaction between service users and staff. This became a broad category, somewhat reducing its sensitivity. The physical environment was frequently involved, although generally limited to changes made to wards to make them more therapeutic, something recently highlighted by the CQC in the UK. There was less attention paid to the overall architecture and design of wards, which was unsurprising when few services have resources for a full redesign. There may be aspects of overall structure, such as visibility of staff and service users, natural light, opportunities for private space or fresh air, that reduce restrictive practices. Again, these modifications were often made in conjunction with other intervention procedures, meaning that the effect on behaviour of physical restructuring alone is unknown.

Feedback and monitoring

This was a frequently identified component of many of the interventions and has a range of BCTs associated with it. As described above, it is difficult to identify feedback on behaviour within these interventions as successful de-escalation may not be recorded, whereas outcomes of the (failed) behaviour are routinely recorded. As well as the feedback and monitoring BCTs, other BCTs relating to social support, information about antecedents, social comparison and reward within these procedures were also detected; it is of interest what role these play in these procedures. There was little description of how the data were fed back to staff, whether delivered verbally, in writing, electronically or during a meeting. It was often unclear what level of detail was provided in the data, whether it was at ward level or service level, over what time period and how identifiable incidents would be to those involved. These might be important factors to test to better determine whether or not feedback and monitoring changes behaviour, and again the use of theory would allow these factors to be tested.

Discussion of behaviour change technique synthesis

The BCT taxonomy has been used more frequently to systematically describe interventions that are targeted at service users rather than at health-care professionals, and although this is not the first study to apply the taxonomy to interventions targeting staff behaviour it is a relatively new area.[47] Previous work in this area has made modifications to the taxonomy definitions to enable a better fit, and this was required here.[47] Most of the BCTs could be applied directly to the interventions, but some were more complicated because of the different contexts in which they could occur. For example, the BCT 'problem-solving' could feature in a number of settings such as with individual service users on admission or after an episode of restrictive practice, between staff during a ward safety huddle, or via meetings involving managers, staff and service users. These difficulties were addressed by further coding these BCTs using and identifying and reporting subthemes that capture this variety of use.

Targeting behaviour of staff versus behaviour of service users

One of the challenges of this approach was associated with the target that the intervention was focused on, that is staff or service user behaviour, and subsequently how to code this. Many instances were detected in interventions when a BCT was being used that was targeting the service user but that could also change staff behaviour, for example the introduction of a sensory room aiming to change the behaviour of service users and facilitate self-care to reduce distress. In that respect it was targeting service user behaviour; however, it also changed staff behaviour because the introduction of a sensory room provides an additional resource that they can use to support people experiencing distress. This has come about through either restructuring the physical environment or adding objects to the environment to either reduce antecedents to conflict or promote de-escalatory behaviour if conflict arises. As such, this was included and coded as a BCT. The interpersonal relationships between service users and health-care staff are extremely important and it cannot be assumed that the escalation of conflict behaviour is always generated by the service user: the staff member may contribute equally, whether intentionally or not. An intervention such as a sensory room can therefore facilitate de-escalatory behaviour from the staff member as it might promote calmer behaviour from the service user.

A further example was apparent in 'action-planning', and this often included care planning with an individual service user. It could be seen that this was an attempt to change the service user's behaviour in the event of them becoming distressed and, on one level, this may prove the case; however, the activity of action-planning with the service user may also cause the staff to action-plan. They may discover that when this service user becomes distressed, they are made more distressed by a noisy environment. They can then plan to help the service user to find a quieter space in the event of distress, which in turn successfully avoids the use of restrictive practices. As interventions can affect the behaviour of staff, service users and visitors in the therapeutic milieu to different degrees, it is important that this is acknowledged while retaining the focus on staff behaviour and how it might be changed.

The one BCT that lacked sensitivity in this study was also one of the most frequently used, namely 'restructuring the social environment'. This was used to capture a broad range of changes implemented by interventions from a strategic management level through to everyday interactions between service users. The decision to create subcategories (e.g. access to staff, management support, promote socialisation) for this BCT to retain this detail addresses this difficulty to a certain degree but it might be considered a limitation when viewing the overall summaries of the BCTs coded in this study.

Future development of BCT coding could consider the use of subcategories. Some of this information could be seen as contextual rather than relating to a specific BCT. For example, it is unclear whether a new type of staff meeting is a BCT in itself or the BCT is only what happens during the meeting, for example problem-solving and practical social support. This may be a grey area that was specific to these data and not easily addressed through the use of subcategories. Presseau *et al.*[47] also found that this code required more specificity when coding system-level interventions, and recommended the addition of what is 'restructured', preferably within an explicit programme theory.

'Behaviour' versus 'outcomes of behaviour'

For this study, the target 'outcome of the behaviour' was an absence of something happening, such as reduced seclusion episodes or fewer restraints. The target 'behaviour' was successful de-escalation, which is itself not an absence of carrying out restrictive practice but a proactive attempt to avoid it by using other strategies. Although it was clear for this study that the desired 'behaviour' was that which sought to reduce the use of restrictive practice, often described as de-escalatory behaviour, this was almost never measured or even accounted for among the interventions. The focus was always on the 'outcomes' of the behaviour, such as the number of restraints or seclusions. This meant that feedback about the 'behaviour' could rarely be identified as the focus was on feedback on 'outcomes of behaviour'. This somewhat fails to acknowledge successful de-escalation.

Behaviour change technique dosage

The frequency of use of BCTs whether they were present or not within an intervention was summarised, not how many times evidence of their use was detected. Therefore, this does not reflect the 'dose' of each BCT. It is possible to report this cumulatively using NVivo software, but is not meaningful across a large number of interventions.

The use of theory was not explicit in many of the interventions, which is not unusual in health services research.[66] This is a significant weakness of this evidence as the explicit use of theory would allow better comparison between interventions in terms of what assumptions the intervention is based on, how the techniques that have been employed are expected to have an effect, and how effective this ultimately was. It is recommended that developers of future interventions make more explicit use of theory.

Comparison with previous research

There is little previous research with which to compare the results of the current study. The only other study to apply the BCT taxonomy to interventions seeking to change professional behaviour, Presseau *et al.*,[47] reported some similar findings, albeit in a different area of health care (diabetes care).

Pressau *et al.*[47] identified 21 BCTs in 11 clusters, compared with 43 in 14 clusters identified in the current study. The BCTs identified most frequently in Pressau *et al.*[47] differed from those reported here, which is not unexpected as the two studies concerned interventions targeting different issues. Pressau *et al.*[47] did not find covert learning, self-belief (similar to the current study findings) or use of regulation and scheduled consequences (in contrast with the current study findings) evident in intervention materials. The current study detected small numbers of one of the BCTs in each of these categories. In addition, Pressau *et al.*[47] detected no BCTs targeting identity, whereas role modelling and 'reframing' occurred within many of the interventions reported in the current study. This latter point may be related to the reality that moving to a *Trauma-Informed Care* system involves reframing perspectives on restrictive practices as a key element.

Therefore, the current study contributes further insights into the potential of the BCT taxonomy to understand mechanisms for change in the behaviour of staff in health settings. Potentially, further research into the use of BCTs may facilitate the emergence of a recognisable set of BCTs likely to be effective across diverse health settings, and others which are particularly helpful in specific contexts.

Chapter 10 Conclusions

This chapter addresses the strengths and limitations of the study, reflecting on how the scope and quality of the evidence base has had an impact on the study outcomes. The chapter highlights implications for practice and makes recommendations for future research.

Strengths and limitations

The study objectives were to:

1. provide an overview of interventions aimed at reducing restrictive practices in adult mental health inpatient settings
2. classify components of those interventions implemented in terms of BCTs and determine their frequency of use
3. explore evidence of effectiveness by examining BCTs and intervention outcomes
4. identify BCTs showing the most promise of effectiveness and that may require testing in future high-quality evaluations.

Strengths

As demonstrated in *Chapters 4–6*, the study was successful in meeting objectives 1 and 2. The current report provides a high level of detail concerning the range, components and application of interventions using BCTs.

A rigorous approach to coding documents was employed, supported by qualitative analysis software (NVivo). All intervention information was stored in one project and the initial coding frame took the form of the BCT taxonomy. Adopting a deductive qualitative analysis for the BCT coding enabled within-BCT-category coding, which allowed the identification of subthemes within the more populated BCTs. It also supported the use of memos to allow communication between the two coders about areas of divergence. This approach was, on reflection, considered to have been a success and will be repeated with a similar study.

Limitations

The broad search strategy that included a wide range of grey literature in diverse formats, together with no criteria for exclusion on the basis of quality, was developed in response to the research team's familiarity with the research field and prior awareness that, although the research evidence was likely to be sparse, there were a large number of interventions being used in practice, with potential to be mapped onto the BCT taxonomy. Our novel approach to searching was comprehensive, and effective in its results, yet records of interventions were disparate in terms of focus and quality. The strategy was thus useful for identifying the number and range of available interventions; however, it does raise questions about how such diverse evidence can be assimilated and appraised in a meaningful way.

Quality of description

With some exceptions, the quality of the description of the content of interventions was very poor. This meant that it is not possible to detect precisely what is happening without information from individual staff. Given that the reporting of the content of interventions is poor, this is a weakness of all reviews of this sort. Contact details for obtaining further information for 140 records were extracted but there were only 14 replies to 100 requests for further information. Four interventions devised by commercial training companies charged a fee for access to their materials. Those resources that had been developed often lacked sufficient detail for coding or had been poorly stored, for example citing outdated URL links. Standards for reporting the development of health research [e.g. via the Enhancing the QUAlity and Transparency Of health Research (EQUATOR) network][245] do not often appear to have

been applied. The use of appropriate guidelines would greatly enhance the quality of research in this area. The reporting of outcomes is a particular difficulty owing to the diverse nature of outcomes used and metrics applied.

Our approach to BCT coding, for example the overcoding of certain BCTs, predominantly 'instruction on how to perform the behaviour' (BCT 4.1), may be considered a risk because this may have enabled the recognition of specifics of training that may not have occurred. Given that this BCT has been used in nearly all of the interventions, it was unfortunate that it was frequently very poorly described and, as aspects of training can vary dramatically, an understanding as to the exact content of much of the training was not gained. However, if this code had not been used whenever training was involved then it would have been under-reported. On balance, it was concluded to be preferable to over-report, with an accompanying call for clarity, rather than disregard. 'Restructuring the social environment' (BCT 12.2) was also used in a wide variety of circumstances and consequently there is some overlap with contextual factors such as service user involvement. It was thought better to have some duplication in this important area than not to code it. The impact of joint working between service users and health-care staff might deter the use of restrictive practices, potentially caused by staff knowing the service user through this different relationship.

Setting

As this was an exploratory piece of work it was limited to adult mental health services. Although a range of adult inpatient settings were included (including acute, forensic and PICU services) this review excluded a range of services and settings where restrictive practices are commonplace. This included Child and Adolescent Mental Health Services, and interventions targeting people with learning disabilities and organic conditions. It may be worthwhile conducting similar research to explore the techniques used to reduce restrictive practices across other settings.

English language as an inclusion criterion

It was beyond the study remit to include material that was not reported in English. It is likely that, by limiting the review to records in English, it was predisposed to identifying interventions from the USA, Canada, Europe and Australia. It is difficult to assess how many additional records might have been included in this review had this limit not been imposed. There are international efforts to reduce restrictive practices across adult psychiatric institutions. For example, there are widespread efforts across Europe that are published in non-English-language journals. Further afield, the use of Pasung (physical restraint and confinement) in Indonesia has been under considerable scrutiny. It is likely that some interventions in some countries that aim to reduce restrictive practices may not have been included.

Implications for policy and practice

There continues to be an urgent need to reduce restrictive practices in inpatient mental health settings. This has been recommended by a range of stakeholders in the UK [including, for example, the National Institute for Health and Care Excellence (NICE) and CQC] and internationally. Service providers urgently require high-quality evidence regarding the effectiveness of interventions to reduce restrictive practices.

The evaluations of interventions frequently report positive results in terms of reductions in restrictive practices. Publication bias aside, the majority of evaluations report positive findings. This implies that, in general, the approaches being used can and do work. However, the evidence base is limited by poor reporting and disregard for theory, and leads to a tendency for individual organisations to develop ad hoc untested interventions or to implement known interventions inconsistently (for example, *Safewards*, *Six Core Strategies*, *No Force First*). Their implementation is often poorly evaluated and studies frequently fail to measure the fidelity to the interventions used,[246] which is crucial to understand how interventions might have been modified during implementation. When they are successful at a local level, there is often a poor understanding of the active components that resulted in the reduction of restrictive practices, hampering the ability to implement them more broadly.

This study describes the extent of the current evidence base and, despite its complexity, indicates where the focus of interventions to date has been with regard to BCTs, and suggests that this is leading to reductions in restrictive practices.

Research recommendations

Multiple procedures

The multiple components and multiple aims of the interventions causes further obscurity. Although a single target might on the face of it be 'reducing restrictive practices', this is a target made up of a range of different practices. Many of the interventions had multiple components; however, without individual testing of the components of interventions, resources might be wasted on elements that are simply not effective, or are perhaps effective only when coterminous with another intervention. This study shows that complex interventions have been developed and implemented, potentially ahead of the rigorous testing required to develop a robust evidence base. For example, the current review did not find evidence to answer questions such as Is repeated staff training necessary? How important is action-planning? Is overall care planning better than specific safety planning or risk assessment?

Outcomes

Restrictive practices include a variety of outcomes and they are often reported in diverse ways using a range of units of analysis, for example restraints per service user, or restraints per day. Studying the reduction in the use of PRN medication might require a quite different approach to outcomes evaluation, compared with reducing restraint. For example, where one restrictive practice is reduced, another might increase.

The potential for so much variety here makes it difficult to compare studies and meta-analyse outcome data. There is little consideration of service user-reported outcome measures, and the development of such measures would be a helpful addition to the increasing body of research in this area.

Behaviour change techniques showing the most promise

When interventions were examined by target, type of study or reported findings, it was apparent that there was a small group of BCTs that were most frequently found across all the interventions, such as 'instruction on how to perform the behaviour', 'restructuring the social environment', 'problem-solving' and 'action-planning'.

A complication of this finding was that the BCT 'restructuring the social environment' was a broad category that, for the purposes of this study, encompassed several subcategories. There were some variations that might tentatively indicate that some BCTs were more effective in reducing restrictive practices than others. The RCTs appeared to make more use of 'prompts or cues' and 'information about antecedents' than those studies that reported no positive findings. Caution in interpreting this finding is required owing to the small number of RCTs and, indeed, the small number of studies reporting no effects.

Because of the generally weak evidence base around interventions evaluation, including the small number of RCTs, this review cannot confidently recommend the testing of specific BCTs that show promise. Instead, there appears to be a strong argument for intervention developers to consider the specific components of interventions, and why and how these individual components might be tested.

Undetectable behaviour change techniques

Fifty BCTs were either not found at all, or found only rarely. Of these, some will not be applicable, some might have been presented in practice but were undetectable from available reports, and others might never have been considered and yet could be effective. Videos of training sessions and observational work would help elaborate on this and could be considered in future studies.

As BCTs using reward and threat were rarely detected, it may be valuable to explore the potential of this area to have an impact on the reduction of restrictive practices.

Pro re nata medication

That so few studies have focused on chemical restraint/rapid tranquillisation is concerning. There is widespread and frequent use of chemical restraint (rapid tranquillisation) in acute mental health wards. Given that most medicines given at this time are either benzodiazepines or antipsychotics, further research in this area is warranted. It is also clear that the process of offering and/or refusing PRN medication can lead to an escalation in the use of restrictive practices, and additional understanding of this process may lead to a subsequent reduction in restrictive practices.

Concluding comments

Despite numerous policy initiatives and recommendations from bodies such as NICE, the CQC and the Royal College of Psychiatry, there seems to be ongoing concern about the use of restrictive practices in adult inpatient mental health settings. The care of individuals detained in hospitals will remain suboptimal unless there is a sustained focus on reducing these practices. The impact of restrictive practices on the psychological and physical welfare of both service users and staff should not be underestimated. Without sustained effort these practices will continue to occur in institutional settings worldwide.

This study identified a large number of interventions that have been implemented over the past two decades. The findings suggest that there is potential to rationalise complex interventions. More often than not, they have targeted multiple restrictive practices, using multiple procedures and – where they have been measured – applied multiple outcomes. The content of these procedures appears to share common ground in terms of the clusters of behaviour change techniques used. Evaluated interventions tend to report positive findings. This suggests an understated set of assumptions about how interventions are intended to work, and through which mechanisms. Making these assumptions explicit through the use of theory would enable the testing, measurement and refinement of interventions to maximise their effect.

It is proposed that the learning from this study should be applied to the development and testing of future interventions to reduce restrictive practices through targeting health-care staff behaviour. This study has identified commonly used BCTs and they do appear to result in the reduction of restrictive practices. However, future interventions should be theoretically informed, test procedures in isolation, be rigorously described and measure their outcomes using a common language.

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Contributions of authors

John Baker (https://orcid.org/0000-0001-9985-9875) was responsible for leading the study, protocol development, contributed to literature searches, data extraction and analysis, and writing and editing the report.

Kathryn Berzins (https://orcid.org/0000-0001-5002-5212) was responsible for co-ordinating the study, contributed to literature searches, data extraction and analysis, BCT mapping and writing and editing the report.

Krysia Canvin (https://orcid.org/0000-0001-6571-6411) contributed to literature searches, data extraction and analysis, BCT mapping and writing and editing the report.

Iris Benson (https://orcid.org/0000-0001-5710-4706) (MBE) our patient and public involvement (PPI) representative throughout the project, contributed to the Steering Group, the plain English summary and the dissemination strategy.

Ian Kellar (https://orcid.org/0000-0003-1608-5216) provided expertise in BCT mapping, and contributed to writing and editing the report.

Judy Wright (https://orcid.org/0000-0002-5239-0173) developed and advised on the search strategies and contributed to the final report.

Rocio Rodriguez Lopez (https://orcid.org/0000-0003-2460-8128) developed and advised on the search strategies and contributed to the final report.

Joy Duxbury (https://orcid.org/0000-0002-1772-6874) provided expertise in restrictive interventions.

Tim Kendall (https://orcid.org/0000-0003-3825-3022) provided policy expertise.

Duncan Stewart (https://orcid.org/0000-0001-7355-4280) provided expertise in restrictive interventions and contributed to writing and editing the final report.

Data-sharing statement

No new data have been created in the preparation of this report and, therefore, there is nothing available for access and further sharing. All queries should be submitted to the corresponding author.

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Appendix 1 Databases and resources searched

Academic databases searched for published studies: February 2018 and April 2019

- BNI (via ProQuest): 1992 to February 2018.
- BNI (Healthcare Databases Advanced Search via ProQuest): 1992 to April 2019.
- CINAHL (via EBSCO*host*): 1981 to present.
- CCTR (via Wiley Online Library): issue 1 of 12, January 2018.
- CCTR (via Wiley Online Library): issue 4 of 12, April 2019.
- CDSR (via Wiley Online Library): issue 2 of 12, February 2018.
- CDSR (via Wiley Online Library): issue 4 of 12, April 2019.
- DARE (via Wiley Online Library): issue 2 of 4, April 2015.
- EMBASE Classic + EMBASE (via Ovid): 1947 to 2019 April 16.
- HTA Database (via Wiley Online Library): issue 4 of 4, October 2016.
- HTA Canadian and International (Centre for Reviews and Dissemination, University of York) (on 24 April 2019).
- Ovid MEDLINE®: 1946 to April Week 1 2019.
- Ovid MEDLINE® Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily to 16 April 2019.
- NHS EED (via Wiley Online Library): issue 2 of 4, April 2015.
- PubMed (National Library of Medicine) 1946 to present.

Grey literature resources

Databases searched for unpublished studies

- ClinicalTrials.gov (US National Institutes of Health).
- Dissertations & Theses A&I (ProQuest): 1743 – present.
- Evidence Search (NICE).
- International Clinical Trials Registry Platform (World Health Organization).
- OpenGrey (INIST-CNRS).

Websites searched

Websites and search engines were searched for research and non-research reports of interventions.

The search engine Google was used plus the following websites.

Mental health organisations

1. European Violence in Psychiatry Group (EViPRG) (http://eviprg.eu/).
2. Mental Welfare Commission for Scotland (www.mwcscot.org.uk/).
3. National Mental Health Consumer and Carer Forum (https://nmhccf.org.au/).
4. CPI (www.crisisprevention.com/).
5. Safe Crisis management (https://safecrisismanagement.com).
6. Healthcare Improvement Scotland (http://ihub.scot/).

Health-care organisations

National

1. NICE Evidence (UK) (see database section above).
2. SAMHSA (USA) (www.samhsa.gov/).
3. National Association of State Mental Health Program Directors (USA) (www.nasmhpd.org/).
4. Canadian Mental Health Commission (www.mentalhealthcommission.ca/English/).
5. Depression and Bipolar Support Alliance (DBSA) (https://dbsalliance.org).

Regional

1. Seclusion and Restraint Reduction Leadership Group (Texas, USA) (http://tnoys.org/srr-leadership-group/).

Societies/colleges

Psychiatrists

1. The World Association of Social Psychiatry (WASP) (www.waspsocialpsychiatry.com; https://coercioninpsychiatry.com/references/).
2. European Psychiatric Association (www.europsy.net/).
3. American Psychiatric Association (www.psychiatry.org/).

Nurses

1. International Society of Psychiatric Mental Health Nurses (www.ispn-psych.org/).
2. Mental Health Nurses Association (MHNA) (UK) (www.unitetheunion.org/how-we-help/list-of-sectors/healthsector/healthsectoryourprofession/mhna/).
3. American Psychiatric Nurses Association (APNA) (www.apna.org/i4a/pages/index.cfm?pageid=1).
4. Australian College of Mental Health Nurses (www.acmhn.org/).

Charities

1. Rethink (www.rethink.org/).
2. MIND (www.mind.org.uk/).
3. Mental Health Foundation (www.mentalhealth.org.uk/statistics).
4. National Alliance on Mental Illness (www.nami.org/).
5. Mental Health Australia (https://mhaustralia.org).

National government health departments

1. Department of Health and Social Care (UK) (www.gov.uk).
2. Australian Government. Department of Health (https://agedcare.health.gov.au).
3. US Department of Health and Human Services (HHS) (www.hhs.gov/).
4. Ministry of Health. New Zealand (www.health.govt.nz/).

Health-care quality agencies

1. NICE Quality Standards (www.nice.org.uk/standards-and-indicators).
2. CQC (UK) (www.cqc.org.uk/).
3. NHS Improvement (https://improvement.nhs.uk/).
4. AHRQ (www.ahrq.gov/).

5. Australian Commission on Safety and Quality in Health Care (www.safetyandquality.gov.au/).
6. Health Quality Ontario (www.hqontario.ca/).
7. Health Quality & Safety Commission New Zealand (www.hqsc.govt.nz/).

Training providers

1. Skills for Health (UK) (www.skillsforhealth.org.uk/).
2. CPI (www.crisisprevention.com/).
3. Restraint Reduction Network (http://restraintreductionnetwork.org/).
4. Dynamic intervention (https://dynamicinterventions.org).
5. Challenging Behaviour Foundation (UK) (www.challengingbehaviour.org.uk/).
6. Royal College of Nursing (www.rcn.org.uk/).
7. CALM (www.calmtraining.co.uk/).
8. BILD (www.bild.org.uk/).
9. Caring Solutions (www.caringsolutionsukltd.com/).
10. Centre for Mental Health (www.centreformentalhealth.org.uk/).
11. Scottish Association for Mental Health (SAMH) (www.samh.org.uk/).
12. Support in Mind Scotland (www.supportinmindscotland.org.uk/).

E-mail lists

E-mail lists contacted for research and non-research reports of interventions:

- LIS-MEDICAL@jiscmail.ac.uk
- CLIN-LIB@Jiscmail.ac.uk
- MENTAL-HEALTH-LIBRARIES@jiscmail.ac.uk.

Social media

Social media resources searched for research and non-research reports of interventions:

- YouTube
- Facebook
- Twitter.

Appendix 2 Search strategies

Search strategies are summarised and tabulated below. For the detailed search strategy and strings, see *Report Supplementary Material 1*.

Summary of search strategies

Academic databases
BNI (ProQuest): 1992 to February 2018
BNI (Healthcare Databases Advanced Search via ProQuest): 1992 to April 2019
CINAHL (EBSCO*host*): 1981 to present
CCTR (Wiley Online Library): issue 1 of 12, January 2018
CCTR (Wiley Online Library): issue 4 of 12, April 2019
Cochrane Database of Systematic Reviews (Wiley Online Library): issue 2 of 12, February 2018
Cochrane Database of Systematic Reviews (Wiley Online Library): issue 4 of 12, April 2019
DARE (Wiley Online Library): issue 2 of 4, April 2015
EMBASE Classic + EMBASE (Ovid): 1947 to 2019 April 16
HTA Database (Wiley Online Library): issue 4 of 4, October 2016
HTA Canadian and International (Centre for Reviews and Dissemination, University of York)
Ovid MEDLINE(R): 1946 to April week 1 2019
Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily to 16 April 2019
NHS Economic Evaluation Database (Wiley Online Library): issue 2 of 4, April 2015
PubMed (National Library of Medicine): 1946 to present
Databases and registers containing unpublished studies
ClinicalTrials.gov (US National Institutes of Health)
Dissertations & Theses A&I (ProQuest): 1743 to present (searched April 2018 and February 2019)
Evidence Search (NICE)
International Clinical Trials Registry Platform (World Health Organization)
OpenGrey (INIST-CNRS)
Websites
Mental health organisations
Health-care organisations
Societies/colleges of (i) psychiatrists and (ii) nurses
Charities
National government health departments
Health-care quality agencies
Training providers
Google (advanced search interface): national and international
E-mail requests for information
Social media
YouTube
Facebook
Twitter

Appendix 3 Terms entered into Abstrackr

Terms indicating relevance		
4 steps to safety	mental health	psychiatry
4pi national involvement standards	mental health nursing simulation on workplace violence	psychogeriatric
6 core strategies	methodical work approach	psycho-geriatric
adults	multimodal functional model	reduce
alternative to restraint flowsheet	no force first	reducing
calm	no restraint policy	respect
city nurse	non-pharmacological	restrain yourself
de-escalate	nonviolent crisis intervention	restrain yourself
de-escalation	omega program	restraint
exbelt	pasung	restraint reduction network
force	positive alternatives to restraint and seclusion	restrictive
forced medication	positive and safe champions network	restrictive practices
fours model	positive and safe initiative	Safewards
four steps to safety	positive behaviour support	Scottish patient safety programme
handle with care	program	seclusion
initiative	project beta	seclusion and restraint reduction initiative
inpatient	promise	six core strategies
intervention	psychiatric	staying safe
		teamstepps
Terms indicating irrelevance		
administration	factors associated	prevalence
adolescent	diabetes	perception
alcohol withdrawal	drinking	perspectives
alzheimer	early intervention service	pharmaceutical
alzheimer's	earthquake	pharmacologic
antibiotic	falls	pharmacological
arthritis	general	pharmacy
assertive community treatment	hiv	philosophy
associated with	intellectual disability	physical
attitudes	intellectual disability	primary care
behavioural disabilities	intellectually disabled	prison
brain injury	learning disability	quadriplegia
cancer	mental disabilities	rats

Terms indicating irrelevance		
cardiac	mental retardation	refugee
care home	military	relationship
child	minors	risk factors
children	neurocognitive disorders	risk profile
community	nonpsychiatric	sars
critical care	nursing home	school
delirium	outpatient	self-harm
dementia	outpatient commitment	stroke
determinants	pain	surgical
developmental disabilities	palliative	tinnitus
emergency department	paediatric	views
erratum	predict	youth
factors affecting	predictors	

Appendix 4 Extraction items

Recommendations	Extracted
COCHRANE 1. Record	1.1 Author(s)
	1.2 Title
	1.3 Journal
	1.4 Peer reviewed (y/n)
	1.5 Year
	1.6 Publication format
COCHRANE 2. Evaluations	2.1 Evaluation (y/n)?
	2.2 Design
	2.2.1 Randomised?
	2.2.2 Controlled?
	2.3 Evaluation period (if not available: overall length of study)
	2.4 Outcome measures used
	2.4.1 Standardised outcome measure used
	2.4.2 Data collection from existing records or developed/recorded for study
	2.5 Findings reported (y/n)
	2.5.1 Significant outcome reported (y/n)?
	2.6 Study funder

n, no; y, yes.

WIDER 1. Detailed description of interventions in published papers	
1.1 Characteristics of those delivering the intervention	1.1.1 Provider: in-house/external
	1.1.2 Provider: organisation name
	1.1.3 Provider: detail
1.2 Characteristics of the recipients	1.2.1 Sample: size (*n* of people)
	1.2.2 Sample: description
1.3 The setting	1.3.1 City
	1.3.2 State/province
	1.3.3 Country
	1.3.4 Setting: size (*n* of beds/wards)

WIDER 1. Detailed description of interventions in published papers	
1.4 The mode of delivery	1.4.1 Training education
	1.4.2 Sensory room
	1.4.3 Role models
	1.4.4 Care-planning
	1.4.5 Debriefing
	1.4.6 Assessing risk
	1.4.7 Reviewing incident data
	1.4.8 Increased staffing
	1.4.9 Nursing changes TIC
	1.4.10 Improved communication
	1.4.11 Change in policy rules
	1.4.12 Enhanced leadership
	1.4.13 Activities
	1.4.14 Rapid response team
	1.4.15 Service user involvement
	1.4.16 Miscellaneous
1.5 The intensity	1.5.1 How often
1.6 The duration	1.6.1 Intervention: date done
	1.6.2 Intervention: start date
	1.6.3 Intervention components: duration
	1.6.4 Permanent (y/n)
1.7 Adherence/fidelity to delivery protocols	1.7.1 Voluntary/mandatory
	1.7.2 Report tailoring or modification (y/n)
	1.7.3 Report fidelity (y/n)
1.8 Detailed description of the intervention content provided for each study group	1.8.1 Delivery of control described
WIDER 2. Clarification of assumed change process and design principles	
2.1 The intervention development	2.1.1 Service user involvement in intervention development (y/n)
	2.1.2 Service user involvement detail
	2.1.3 Costs of intervention
2.2 The change techniques used in the intervention	[See BCT coding]
2.3 The causal processes targeted by these change techniques	2.3.1 Aim of intervention
	[See BCT coding]

WIDER 3. Access to intervention manuals/protocols	
3.1 Submit protocols or manuals for publication to make these supplementary materials easily accessible (i.e. online)	3.1.1 Materials available? 3.1.2 Website 3.1.3 Contact available for information? (y/n) 3.1.4 Contact name 3.1.5 E-mail
WIDER 4. Detailed description of active control conditions	
THEORY coding	Explicit mention of theory (name)? (y/n) Theory used in intervention design? (y/n) Theory used in interventions implementation? (y/n) Results related back to the theory? (y/n)

n, no; TIC, *Trauma-Informed Care*; y, yes.

Appendix 5 Coding manual

Behaviour change technique coding: issues and assumptions

Assumptions

- We are applying the BCT taxonomy to interventions that aim to change staff behaviour in terms of how staff interact with patients.
- The intervention target is interaction between staff and patients: 'The final target of most interventions was to organically change interactions between patients and between staff and patients'.[16]
- Objects added to make environment more comfortable, etc., are for patients but aimed at increasing quality of interaction and reducing conflict and aggression (which leads to restrictive practices).
- 'Self' can include individual and groups of staff as opposed to management.
- Knowing that data are being collected is not the same as receiving feedback.

Common interventions and potential behaviour change technique codes

Intervention procedure	BCT code
Behavioural plans/contracts for patients/patient plan	• Problem-solving • Information about antecedents • Goal-setting (outcome) • Prompts
Data review	• Discrepancy between current behaviour and goal • Review outcome goals • Monitoring of behaviour by others without feedback • Feedback on outcome(s) of behaviour • Problem-solving • Action-planning
Debrief/witnessing	• Problem-solving • Feedback on outcome(s) of behaviour • Social support (emotional) • Monitoring of emotional consequences • Reduce negative emotion • Remove punishment • Consider salience of consequences if service user testimony is a key part
Leadership or management changes	• Restructuring the social environment
Meetings between frontline and management staff (no patients)	• Restructuring the social environment • Social support (unspecified or practical) • Problem-solving • Action-planning
Meetings between frontline staff (no patients) (e.g. safety huddle)	• Problem-solving • Action-planning • Social support (unspecified or practical) • Self-monitoring of behaviour
Care-planning meetings between individual staff and patient	• Problem-solving • Action-planning • Goal-setting (if goals mentioned)
Meetings between staff and patients (group)/ community meeting	• Restructuring the social environment • Information about antecedents • Problem-solving • Social support (unspecified) • Avoidance/reducing cues

Intervention procedure	BCT code
Posters	• Prompts or cues
Rapid response team	• Social support (practical) • Restructuring the social environment
Risk assessment	• Problem-solving • Information about antecedents (if triggers) • Avoidance/reducing cues • If a tool: also prompt/cues
Rule changes	• Restructuring social environment
Sensory equipment	• Objects • Prompts or cues
Sensory Rooms	• Prompts or cues • Restructuring the physical environment • Adding objects to the environment
Sharing learning events	• Identifying the self as role model • Social support practical
Staff visibility	• Avoidance/reducing exposure to cues for the behaviour • Restructuring social environment
Tools	• Prompts • Problem-solving
Train the trainers	• Identify self as role model
Training/education	• Instruction on how to perform the behaviour • Demonstration of the behaviour • Behavioural practice • All social emotional health and physical consequences – consider salience of consequences if use service user testimony
Trauma-informed care, etc. (change of nursing model)	• Framing/reframing • Restructuring the social environment? • Consider all social emotional health and physical consequences – consider salience of consequences if use service user testimony

Clarify difference between similar codes

Code	Decisions
Problem-solving	Patient/staff identify triggers, influences, strategies
Information about antecedents	Information from external source, for example training, not from, for example, patient or staff
Re-attribution	• Causes of patients' behaviour (e.g. trauma) • Causes of staff behaviour (e.g. fear, previous assault)
Framing/reframing	Patient response to trauma About how staff behaviour is framed (e.g. improve quality and safety)
Restructuring the physical environment	More than just adding objects Creating a sensory room, making a ward more comfortable
Adding objects to the environment	To facilitate the behaviour, not prompt or cue – so have removed from risk assessment. Have included poster and safety crosses More than information (so how do we code information leaflets?)

Code	Decisions
Prompts or cues	For example, a risk assessment on admission
Monitoring by self	Where 'self' is 'staff' (e.g. ward teams)
Monitoring by others	System-wide monitoring through Datix (Datix Limited, London) etc.
Habit reversal	For example, 'no' audit. Habit is to say 'no'; change to trying to say 'yes'
Goals and planning	Problem-solving includes activity discussing difficulties with patients, staff or management
	For action-planning to be coded it must mention planning
	Goal-setting – for both behaviour and outcomes and review of same
	Commitment and contracts – must be explicitly mentioned
Feedback and monitoring	Self-monitoring of outcomes and behaviour (as almost always conflated) are treated as the same thing: records and discussion about successes and failures that take place at ward level, including debriefing with a patient (ward is treated as 'the self' as no individuals are ever mentioned)
	Monitoring of outcomes and behaviour by others without feedback (system-level monitoring, e.g. by a researcher)
	Feedback on outcomes and behaviour – data generated centrally and sent back to the ward; debriefing with a patient present or not
Social support	Practical if helping to de-escalate in a group – rapid response team. Emotional if reflecting and discussion
Removing punishment	Non-punitive environment (always debriefing related)
Consequences	If no detail or detail of asphyxiation, etc. (e.g. 'negative consequences of restraint'), code as health consequences
	Emotional – specific reference to psychological trauma
	Social and environmental – hardly anything but damage to property, time taken form-filling, impact on team
	Salience of consequences, only if talking specifically about personal stories of restrictive practices. Can be video or written, not just in person
Reward and threat	Celebrations, plaque, cinema ticket, prizes
Training	Only coded demonstration if it specifically says that
	Instruction is the one to code all mention of training
	Behaviour practice if it includes role play or interactive element

Definitions within COMPARE (present study)

Term used in BCT	Definition in COMPARE
Outcome Outcome goal (positive outcome of wanted behaviour)	• Restrictive practices (frequency, duration, number of patients)
Target (behaviour)	• Interaction between staff and patients
Behaviour goal Wanted behaviour The behaviour to be achieved	• Alternatives to restrictive practices (e.g. de-escalation) • Preventative strategies (e.g. soft words) • What about doing the training?
The behavioural problem	• Use of restrictive practices • Other staff behaviours that contribute to restrictive practices

Appendix 6 Behaviour change technique coding levels applied in this review

Group	BCT	Coding level			
		Individual	Unit (ward)	Service	Policy
1. Goals and planning	1.1. Goal-setting (behavior)	✗	✗		
	1.2. Problem-solving	✗	✗	✗	
	1.3. Goal-setting (outcome)	✗	✗	✗	✗
	1.4. Action-planning	✗	✗	✗	
	1.5. Review behavior goal(s)	✗	✗		
	1.6. Discrepancy between current behavior and goal	✗	✗		
	1.7. Review outcome goal(s)	✗	✗	✗	
	1.8. Behavioral contract	✗	✗	✗	
	1.9. Commitment	✗	✗	✗	
2. Feedback and monitoring	2.1. Monitoring of behavior by others without feedback			✗	
	2.2. Feedback on behavior	✗	✗		
	2.3. Self-monitoring of behavior	✗	✗		
	2.4. Self-monitoring of outcome(s) of behavior	✗	✗		
	2.5. Monitoring of outcome(s) of behavior without feedback			✗	
	2.6. Biofeedback	✗			
	2.7. Feedback on outcome(s) of behavior		✗	✗	
3. Social support	3.1. Social support (unspecified)	✗	✗	✗	
	3.2. Social support (practical)	✗	✗	✗	
	3.3. Social support (emotional)	✗	✗	✗	
4. Shaping knowledge	4.1. Instruction on how to perform the behavior	✗	✗	✗	
	4.2. Information about antecedents	✗	✗	✗	
	4.3. Re-attribution	✗	✗	✗	
	4.4. Behavioral experiments	✗	✗		
5. Natural consequences	5.1. Information about health consequences	✗	✗	✗	
	5.2. Salience of consequences	✗	✗	✗	
	5.3. Information about social and environmental consequences	✗	✗	✗	
	5.4. Monitoring of emotional consequences	✗	✗	✗	
	5.5. Anticipated regret	✗	✗		
	5.6. Information about emotional consequences	✗	✗	✗	

Group	BCT	Coding level			
		Individual	Unit (ward)	Service	Policy
	6. Comparison of behavior	✗	✗	✗	
	6.1. Demonstration of the behavior	✗	✗	✗	
	6.2. Social comparison	✗	✗	✗	
	6.3. Information about others' approval	✗	✗		
7. Associations	7.1. Prompts or cues	✗	✗		
	7.2. Cue-signalling reward	✗	✗		
	7.3. Reduce prompts or cues	✗	✗		
	7.4. Remove access to the reward	✗	✗		
	7.5. Remove aversive stimulus	✗	✗		
	7.6. Satiation	✗			
	7.7. Exposure	✗			
	7.8. Associative learning	✗			
8. Repetition and substitution	8.1. Behavioral practice/ rehearsal	✗	✗	✗	
	8.2. Behavior substitution	✗	✗		
	8.3. Habit formation	✗	✗		
	8.4. Habit reversal	✗	✗		
	8.5. Overcorrection	✗			
	8.6. Generalisation of target behavior	✗	✗		
	8.7. Graded tasks	✗			
9. Comparison of outcomes	9.1. Credible source	✗	✗	✗	
	9.2. Pros and cons	✗	✗		
	9.3. Comparative imagining of future outcomes	✗	✗		
10. Reward and threat	10.1. Material incentive (behavior)	✗	✗	✗	
	10.2. Material reward (behavior)	✗	✗	✗	
	10.3. Non-specific reward	✗	✗	✗	
	10.4. Social reward	✗	✗	✗	
	10.5. Social incentive	✗	✗	✗	
	10.6. Non-specific incentive	✗	✗	✗	
	10.7. Self-incentive	✗	✗		
	10.8. Incentive (outcome)	✗	✗	✗	
	10.9. Self-reward	✗	✗		
	10.10. Reward (outcome)	✗	✗	✗	
	10.11. Future punishment	✗	✗	✗	
11. Regulation	11.1. Pharmacological support	✗			
	11.2. Reduce negative emotions	✗	✗	✗	
	11.3. Conserving mental resources	✗			
	11.4. Paradoxical instructions	✗			

Group	BCT	Coding level			
		Individual	Unit (ward)	Service	Policy
12. Antecedents	12.1. Restructuring the physical environment	✗	✗	✗	✗
	12.2. Restructuring the social environment	✗	✗	✗	✗
	12.3. Avoidance/reducing exposure to cues for the behavior	✗	✗		
	12.4. Distraction	✗			
	12.5. Adding objects to the environment	✗	✗	✗	
	12.6. Body changes	✗			
13. Identity	13.1. Identification of self as role model	✗	✗		
	13.2. Framing/reframing	✗	✗	✗	
	13.3. Incompatible beliefs	✗			
	13.4. Valued self-identify	✗			
	13.5. Identity associated with changed behavior	✗			
14. Scheduled consequences	14.1. Behavior cost	✗			
	14.2. Punishment	✗			
	14.3. Remove reward	✗			
	14.4. Reward approximation	✗			
	14.5. Rewarding completion	✗			
	14.6. Situation-specific reward	✗			
	14.7. Reward incompatible behavior	✗			
	14.8. Reward alternative behavior	✗			
	14.9. Reduce reward frequency	✗			
	14.10. Remove punishment	✗			
15. Self-belief	15.1. Verbal persuasion about capability	✗			
	15.2. Mental rehearsal of successful performances	✗			
	15.3. Focus on past success	✗			
	15.4. Self-talk	✗			
16. Covert learning	16. Covert learning				
	16.1. Imaginary punishment	✗			
	16.2. Imaginary reward	✗			
	16.3. Vicarious consequences	✗			

Appendix 7 Intervention families (interventions with multiple records)

Intervention family	Records	Intervention report	Research report	Service report	Tool	Practice example	Training link	Study type			
								Same study	Follow-up study	Replication study	Pilot study
1. *Six Core Strategies*	18	✗[92]	✗[17,72,74,75,144,203,211]	✗[89,192,219,247]	✗[133,214]						
		✗[248,249]						Y			
			✗[23,99]					Y			
2. *Beacon Project*	2		✗[115,116]					Y			
3. *Behavioural Support Planning*	2		✗[217]		✗[217]			Y			
4. *Brøset Violence Checklist*	3		✗[112–114]								Y
5. *City Nurse*	2		✗[101,102]							Y	
6. *Comfort Rooms*	2		✗[215]	✗[191]							
7. CPI/*MAPA*	2						✗[95,250]				
8. *DASA-IV*	2					✗[86,236]					
9. *Early Recognition Method*	3		✗[118]		✗[118,119]			Y			
10. *Initiatives to Reduce Seclusion and Restraint*	2		✗[107,108]						Y		
11. *Mutual Help Meetings*	3					✗[83,236]					
12. *No Force First*	3		✗[24,134]			✗[85]					
13. *Novel Seclusion Reduction Program*	2		✗[90]	✗[251]							
14. *Open-Door Policy*	3		✗[109,111]						Y		
15. *Patient-Focused Nursing*	2		✗[104,139]							Y	
16. *Positive and Safe*	2			✗[252]	✗[253]						
17. *Positive Behaviour Support*	2					✗[85,236]					
18. *PROMISE*	2					✗[85,159]					
19. *Recovery-Based Principles*	2		✗[6,117]					Y			
20. *Respect Training*	3					✗[87,236]	✗[254]				

Intervention family	Records	Intervention report	Research report	Service report	Tool	Practice example	Training link	Study type			
								Same study	Follow-up study	Replication study	Pilot study
21. *REsTRAIN Yourself*	4		✗[22]		✗[121]	✗[85,87]		Y			
22. *Review*	2		✗[106,220]							Y	
23. *Safewards*	10		✗[15,16,181,194,195,197,255]								
			✗[88,100]					Y			
24. *Scottish Patient Safety Programme For Mental Health*	4	✗[122,123]	✗[124]		✗[91]			Y			
25. *Seclusion Reduction Program*	4		✗[182,209,212,221]								
26. *Sensory Modulation*	4		✗[135–137,152]								
27. *Sensory Rooms*	3		✗[158,183,231]								
28. *Talk First*	5			✗[83,125]	✗[126]	✗[86,236]		Y			
29. *Tower Hamlets Violence Reduction Collaborative*	2		✗[153]			✗[85]					
Total	100	–	–	–	–	–	–	9	2	3	1

MAPA, Management of Actual or Potential Aggression; PROMISE, Proactive Management of Integrated Services and Environments; Y, yes.

Appendix 8 Interventions by type and format

Practice examples

Author(s)	Description	Intervention examples described
AHRQ[198]		Code Grey (crisis response team)
		SPARK
Lombardo *et al.*[159]		*PROMISE*
CQC[85]	*Effective approaches to reduce restrictive practice*	HOPES model
		No Force First
		Positive Behaviour Support
		PROMISE
		REsTRAIN Yourself
		Tower Hamlets Violence Reduction Collaborative
Mind[87]	*Good practice initiatives*	Respect
		REsTRAIN Yourself
NHS[229]	*Illustrative case studies*	*DASA-IV*
		NHS Improvement
		Talk First
RCP[236]	*Tools and resources for change ideas*	Accredited training courses, peer-support PMVA tutors, PMVA training tool
		Co-produced posters
		DASA-IV
		Expert by experience mentors to staff
		Mutual Help Meetings
		No audit: reflect to reframe
		Peer support
		Personal Behavioural Support plans
		PMVA training
		Positive Behaviour Support framework
		PMVA training plan
		Reducing restrictive practice

Author(s)	Description	Intervention examples described
		RESPECT Training: 'No pain, no panic'
		Safety crosses
		Simulated training
		Talk First
		Values and attitudes training tool

HOPES, Harnessing Opportunities Protective Enhancement (S)ystem; PMVA, Prevention Management of Violence and Aggression; PROMISE, Proactive Management of Integrated Services and Environments; SPARK, Sheppard Pratt Aggression Reduction Campaign.

Service reports

Author(s)/service	Intervention
Alegent Health	*Trauma-Informed Care*
Worcester State Hospital[92]	*Six Core Strategies*
John J Madden Mental Health Centre[256]	*Environments for the reduction of restraint and seclusion*
Barton *et al.*[184]	*Achieving Restraint-free*
Blair and Moulton-Adelman[222]	*Engagement Model*
Cockerton *et al.*[195]	*Safewards*
Guez *et al.*[219] (Massachusetts Department of Mental Health)	*Six Core Strategies*
Kayes and Humphris[257]	*Restraint and Seclusion Reduction Program*
Natale *et al.*[258]	*Caring Theory*
Northumberland Tyne and Wear NHS Foundation Trust[125]	*Talk First; Positive and Safe*
Northumberland Tyne and Wear NHS Foundation Trust[83]	*Talk First; Positive and Safe*
Riemer and Corwith[192]	*Six Core Strategies*
SAMSHA[249]	*Six Core Strategies*
Sivak[191]	*Comfort Rooms*
Szypula and Martin[89]	*Six Core Strategies*
Tees Esk and Wear Valleys NHS Foundation Trust[252]	*Positive and Safe*
Trevarrow[82] (Northumberland Tyne and Wear NHS Foundation Trust)	*Positive and Safe*
Tully[251]	*Novel Seclusion Reduction Program*
Wishnowsky[81]	*Reducing Seclusion and Restraint*

Intervention reports

Author(s)	Intervention
APA, APNA and NAPHS[259]	Ideas for reducing restraint/seclusion
CPI[97]	BERT
Higgins *et al.*[100]	*Safewards*
Huckshorn[92]	*Six Core Strategies*
McEwan *et al.*[123]	*Scottish Patient Safety Programme for Mental Health*
Morrow[248]	*Six Core Strategies*
Scottish Patient Safety Programme[122]	*Scottish Patient Safety Programme for Mental Health*

APA, American Psychiatric Association; APNA, American Psychiatric Nurses Association; BERT, Behavioural Escalation Response Team; NAPHS, National Action Plan for Health Security.

Trainer links

Author(s)/provider	Title/intervention
CPI[95]	CPI training extract
D.Escal8[260]	http://de-escalate.com[260]
Harborview[96]	Training course
Hart[93]	Training video
JKM Training, Inc.[261]	*Reducing Restraints*
Navigo[254]	*Respect Training*
Tees Esk and Wear Valleys NHS Foundation Trust[253]	Positive Approaches Team 4-day course (*Positive and Safe*)
APNA[232]	APNA e-learning centre (2017): seclusion and restraint – assessment and risk mitigation
	APNA e-learning centre (2014–17): shifting the culture – identifying essential elements to reduce workplace violence in health care
BILD	
Behavioural Support Strategies[262]	Behavioural Support Strategies programme
Calm Training[263]	CALM
CPI[95]	*MAPA*
Maybo[224]	SAFER approach
NAPPI UK Ltd	NAPPI
Positive Response Training and Consultancy[228]	*Positive Response*
PRICE[264]	PRICE
Safe Crisis Management Europe[265]	Safe Crisis Management Europe
Space Training Consultants Ltd[235]	Space Training
Specialist Service Training Solutions Ltd[266]	Specialist Service Training
St-ACS Team[267]	*Positive Behaviour Support* training and development programme
Loddon Foundation Ltd[268]	PROACT-SCIPr-UK®

APNA, American Psychiatric Nurses Association; BILD, British Institute of Learning Disabilities; CALM, Campaign Against Living Miserably; MAPA, Management of Actual or Potential Aggression; NAPPI, Non Abusive Psychological & Physical Intervention; PRICE, Protecting Rights in a Caring Environment; St-ACS, St Anne's Community Service.

Tools

Author(s)	Tool description/intervention
Alberta Health Services[230]	Restraint as a last resort flow chart
Aqua[121]	*REsTRAIN Yourself* toolkit
Clark *et al.*[217]	*Behavioural Support Planning* chart
Colton[176]	Checklist for assessing your organisation's readiness for reducing seclusion and restraint
Fluttert *et al.*[118]	FESAI tool (*Early Recognition Method*)
Fluttert *et al.*[119]	*Early Recognition Method* protocol
Huckshorn *et al.*[133]	*Six Core Strategies* planning tool
Northumberland Tyne and Wear NHS Foundation Trust[269]	*Talk First* ward assessment
Northumberland Tyne and Wear NHS Foundation Trust[270]	*Positive and Safe* debrief policy and tool
Northumberland Tyne and Wear NHS Foundation Trust[271]	*Positive and Safe* positive practice process outline
Restraint Reduction Network[214]	Six Key Restraint Reduction Strategies (*Six Core Strategies*)
Scottish Patient Safety Programme[91]	Restraint and seclusion driver diagram phase two
South Australia Health[272]	Mental health restraint and seclusion toolkit (COPING model)
Stirling *et al.*[233]	Reducing restrictive practices checklist

COPING, Control, Orient, Patterns, Investigate, Negotiate, Give; FESAI, Forensic Early Signs of Aggression Inventory.

Instructions

Author	Instructions description/intervention
Health Prince Edward Island[247]	Self-directed resource guide: least restraint 1 – introduction
DMHAS[138]	DMHAS guidelines for development of *Comfort Rooms*
West London NHS Trust[273]	*Positive and Safe*: violence reduction and management programme – instructors manual

DMHAS, Department of Mental Health and Addiction Services.

Websites

1. https://e-learning.apna.org (accessed 20 November 2020)
2. https://www.bild.org.uk (accessed 20 November 2020)
3. https://respecttraining.org (accessed 20 November 2020)
4. https://safecrisismanagement.com/scm-specialty-workshops/ (accessed 20 November 2020)
5. https://de-escalate.com/courses (accessed 20 November 2020)
6. https://aqua.nhs.uk/resource_toolkit/toolkit/ (accessed 20 November 2020)
7. https://restraintreductionnetwork.org/wp-content/uploads/2016/11/Reducing-Restrictive-Practices-Checklist.pdf (accessed 20 November 2020)

8. https://ihub.scot/project-toolkits/safety-principles/safety-principles/least-restrictive-practice-principle/restraint-monitoring-and-training/ (accessed 20 November 2020)
9. https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/clinical+programs+and+practice+guidelines/mental+health/mental+health+training/mental+health+training+courses+offered/mental+health+training+courses+offered (accessed 20 November 2020)
10. https://restraintreductionnetwork.org (accessed 20 November 2020)
11. https://innovations.ahrq.gov/profiles/multipronged-strategy-reduces-use-seclusion-and-restraints-manage-aggression-inpatient (accessed 20 November 2020)
12. https://www.clahrc-eoe.nihr.ac.uk/2016/07/8095/ (accessed 20 November 2020)
13. http://www.gov.pe.ca/photos/original/src_least_restr.pdf (accessed 20 November 2020)
14. https://westlondon.nhs.uk/pmva-manual/ (accessed 20 November 2020)
15. https://www.rcpsych.ac.uk (accessed 20 November 2020)
16. https://www.nabh.org/wp-content/uploads/2018/06/LearningfromEachOtherFINAL.pdf (accessed 20 November 2020).

Appendix 9 Interventions by setting

Interventions	Acute	Admission	Female PD	Geriatric	PICU, including secure	HDU, including secure	Medium/ high security	Forensic, secure	Multiple settings	No details	Not applicable
Standalone intervention	a		b	a	a		a	b	a	d	a
Intervention family											
Six Core Strategies	e						e		e	d	f
Beacon Project								c			
Behavioural Support Planning					c						f
Brøset Violence Checklist	e				e				e		
City Nurse	c										
Comfort Rooms										g	
CPI/*MAPA*											f
DASA-IV	e					e					
Early Recognition Method								c			f
Initiatives to Reduce Seclusion and Restraint									e	d	
Mutual Help Meetings	e									d	
No Force First	e									d	
Novel Seclusion Reduction Program	e							e			
Open-Door Policy					e					d	
Patient-Focused Nursing	e									d	
Positive and Safe										g	
Positive Behaviour Support										g	
PROMISE	e									d	
Recovery-Based Principles					c						
Respect Training											f

Interventions	Acute	Admission	Female PD	Geriatric	PICU, including secure	HDU, including secure	Medium/ high security	Forensic, secure	Multiple settings	No details	Not applicable
REsTRAIN Yourself										g	f
Review										g	
Safewards	e									d	
Scottish Patient Safety Programme For Mental Health	e				e			e			f
Seclusion Reduction Programme		e								d	
Sensory Modulation	e				e						
Sensory Rooms	e				e					d	
Talk First							e			d	
Tower Hamlets Violence Reduction Collaborative	e								e		
Total number of interventions	40	1	1	6	11	1	8	5	10	65	27

MAPA, Management of Actual or Potential Aggression; PD, personality disorder; PROMISE, Proactive Management of Integrated Services and Environments.
a Multiple interventions applied.
b Single intervention applied.
c Single setting of application.
d No details but applied in other settings.
e One of multiple settings of application.
f Intervention setting.
g No details for single setting.

Appendix 10 Interventions by geographical location

Interventions by country

Intervention	USA	Netherlands	Switzerland	Australia	Canada	Spain	Finland	New Zealand	Denmark	UK	Singapore	Germany	Sweden	Not known
Standalone intervention	a	a		a	a	a	b	b		a	a	b	a	a
Intervention family														
Six Core Strategies	c				c	c	c	c		c				
Beacon Project				d										
Behavioural Support Planning										d				
Brøset Violence Checklist			c		c									
City Nurse										d				
Comfort Rooms	d													
CPI/*MAPA*	c									c				
DASA-IV										d				
Early Recognition Method		d												
Initiatives to Reduce Seclusion And Restraint	d													
Mutual Help Meetings										d				
No Force First	c			c						c				
Novel Seclusion Reduction Program										d				
Open-Door Policy			d											
Patient-Focused Nursing	c			c										

Intervention	USA	Netherlands	Switzerland	Australia	Canada	Spain	Finland	New Zealand	Denmark	UK	Singapore	Germany	Sweden	Not known
Positive and Safe										[d]				
Positive Behaviour Support										[d]				
Promise (Proactive Management of Integrated Services and Environments)										[d]				
Recovery-Based Principles				[d]										
Respect Training										[d]				
REsTRAIN Yourself										[d]				
Review	[d]													
Safewards				[c]					[c]	[c]				
Scottish Patient Safety Programme for Mental Health										[d]				
Seclusion Reduction Programme		[d]												
Sensory Modulation				[c]				[c]	[c]					
Sensory Rooms	[c]			[c]						[c]				
Talk First										[d]				
Tower Hamlets Violence Reduction Collaborative										[d]				
Total number of interventions	60	5	2	16	7	3	2	3	2	59	2	1	2	2

MAPA, Management of Actual or Potential Aggression.
a Multiple interventions applied.
b Single intervention applied.
c One of multiple countries of application.
d Single country of application.

Appendix 11 Procedures

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
1. Putkonen *et al.*[17]	✗		✗	✗	✗	✗		✗	✗	✗	✗		✗				10
2. Huckshorn[92]	✗		✗	✗	✗	✗	✗	✗	✗	✗			✗	✗			11
3. Riemer and Corwith[192]	✗		✗	✗	✗	✗	✗	✗	✗	✗			✗				10
4. Lewis *et al.*[132]	✗	✗	✗	✗	✗	✗		✗	✗			✗			✗		10
5. Lombardo *et al.*[159]	✗	✗	✗		✗	✗			✗	✗	✗	✗				✗	10
6. Riahi *et al.*[23]	✗		✗		✗	✗	✗	✗	✗	✗			✗				9
7. Lo[74]	✗		✗		✗	✗		✗	✗	✗			✗	✗			9
8. Duxbury *et al.*[22]	✗			✗	✗	✗		✗	✗		✗	✗	✗				9
9. Wieman *et al.*[211]	✗		✗		✗	✗		✗	✗	✗			✗				8
10. Noorthoorn *et al.*[182]	✗	✗	✗	✗	✗			✗			✗		✗				8
11. Tully *et al.*[90]	✗		✗		✗		✗	✗			✗	✗				✗	8
12. Wolfaardt[75]	✗		✗		✗	✗		✗	✗	✗							7
13. Ash *et al.*[117]	✗	✗			✗	✗	✗		✗	✗							7
14. Ash *et al.*[6]	✗	✗			✗	✗	✗		✗	✗							7
15. Björkdahl *et al.*[129]	✗	✗		✗	✗		✗					✗			✗		7
16. Bowers *et al.*[16]	✗	✗				✗	✗		✗		✗		✗				7
17. Long *et al.*[147]	✗	✗	✗	✗	✗	✗										✗	7
18. Mann-Poll *et al.*[209]	✗	✗	✗	✗	✗			✗					✗				7
19. Taxis[227]	✗	✗	✗	✗	✗	✗		✗	✗						✗		9
20. Short *et al.*[157]	✗	✗	✗	✗			✗		✗								6
21. Smith *et al.*[142]	✗		✗		✗		✗		✗			✗		✗			7
22. Sullivan *et al.*[190]	✗	✗			✗		✗	✗	✗			✗					7

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
23. Hochstrasser *et al.*[111]	✗	✗		✗			✗					✗	✗			✗	7
24. Zuehlke *et al.*[160]	✗	✗		✗						✗	✗		✗				6
25. Smith and Millar[158]	✗	✗	✗			✗	✗			✗							6
26. Georgieva *et al.*[150]	✗				✗		✗					✗			✗	✗	6
27. Madan *et al.*[108]	✗	✗		✗	✗		✗								✗		6
28. Ching *et al.*[115]	✗		✗	✗	✗	✗			✗								6
29. Blair *et al.*[222]	✗	✗	✗	✗		✗						✗					6
30. Borckardt *et al.*[107]	✗	✗		✗	✗		✗								✗		6
31. Aremu *et al.*[151]	✗	✗	✗	✗						✗	✗						6
32. Taylor and Brown[94]	✗			✗	✗	✗		✗								✗	6
33. Qurashi *et al.*[186]	✗		✗	✗				✗		✗							5
34. Maguire *et al.*[116]	✗				✗	✗			✗	✗							5
35. Mistral *et al.*[189]	✗	✗		✗		✗	✗										5
36. Fletcher *et al.*[181]	✗	✗		✗							✗		✗				5
37. Price *et al.*[194]	✗	✗		✗							✗		✗				5
38. Cabral and Carthy[15]	✗	✗		✗							✗		✗				5
39. Maguire *et al.*[197]	✗	✗		✗							✗		✗				5
40. Stead *et al.*[188]	✗	✗	✗	✗	✗												5
41. D'Orio *et al.*[149]	✗				✗									✗	✗		4

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
42. Bell and Gallacher[161]	✗	✗			✗				✗								4
43. Yakov *et al.*[185]	✗					✗			✗							✗	4
44. Godfrey *et al.*[210]	✗			✗			✗							✗			4
45. Steinert *et al.*[20]	✗	✗					✗							✗			4
46. Jonikas *et al.*[180]	✗		✗	✗	✗												4
47. Sullivan *et al.*[104]	✗	✗	✗		✗												4
48. Mann-Poll *et al.*[212]	✗		✗	✗						✗							4
49. Forster *et al.*[234]	✗		✗				✗			✗							4
50. Noorthoorn *e et al.*[221]	✗		✗		✗						✗						4
51. Fluttert *et al.*[118]	✗	✗	✗					✗									4
52. Jungfer *et al.*[109]	✗	✗					✗					✗					4
53. Boumans *et al.*[225]	✗		✗	✗							✗						4
54. Guzman-Parra *et al.*[146]	✗				✗			✗		✗							4
55. Chandler[201]	✗	✗		✗	✗												4
56. Beezhold *et al.*[79]		✗		✗							✗	✗					4
57. Bowers *et al.*[102]		✗		✗							✗	✗					4
58. Pollard *et al.*[274]			✗				✗			✗	✗						4
59. Hernandez *et al.*[99]			✗					✗		✗			✗				4

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
60. Taylor-Watt *et al.*[153]		✗	✗	✗				✗									4
61. Clarke *et al.*[114]	✗			✗				✗									3
62. Sarkar[78]	✗	✗								✗							3
63. McEvedy *et al.*[137]	✗	✗				✗											3
64. Andersen *et al.*[135]	✗				✗	✗											3
65. Martin and Suane[231]	✗				✗	✗											3
66. Goulet *et al.*[166]	✗		✗						✗								3
67. Khadivi *et al.*[275]	✗		✗					✗									3
68. Hellerstein *et al.*[145]	✗		✗				✗										3
69. Calabro *et al.*[141]	✗			✗			✗										3
70. Lee *et al.*[127]	✗					✗		✗									3
71. Brown *et al.*[154]				✗		✗	✗										3
72. Prescott *et al* 2007[128]					✗				✗					✗			3
73. Donat[106]		✗	✗							✗							3
74. Beaglehole *et al.*[223]				✗			✗					✗					3
75. Hochstrasser *et al.*[111]		✗		✗			✗										3
76. Melin[69]	✗						✗										2
77. Cowin *et al.*[163]	✗			✗													2
78. McCue *et al.*[237]	✗		✗											✗	✗		4

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
79. Needham *et al.*[112]	✗							✗									2
80. Sutton *et al.*[152]	✗					✗											2
81. Repique *et al.*[187]	✗	✗															2
82. Fletcher and Stevenson[276]	✗	✗															2
83. Lloyd *et al.*[136]	✗					✗											2
84. Novak *et al.* 2012[183]	✗					✗											2
85. Björkdahl *et al.*[129]	✗	✗															2
86. Yang *et al.*[277]	✗	✗															2
87. Gonzalez[70]	✗	✗															2
88. Chang *et al.*[162]	✗	✗															2
89. Beckett *et al.*[130]	✗	✗															2
90. Bowers *et al.*[101]		✗									✗						2
91. van de Sande *et al.*[200]				✗				✗									2
92. Burhan *et al.*[80]		✗	✗														2
93. Guzman-Parra *et al.*[144]			✗									✗					2
94. Hayes and Russ[143]		✗					✗										2
95. Laker *et al.*[21]	✗																1
96. Omolewa[73]	✗																1
97. Geoffrion *et al.*[148]	✗																1
98. Bybel[71]	✗																1

Author(s)	Training	Nursing changes	Reviewing data	Communication	Care-planning	Sensory room	Change in policy	Assessing risk	Debriefing	Enhanced leadership	Role models	Increased staffing	Service user involvement	Rapid response	Miscellaneous	Activities	Total
99. Kontio *et al.*[199]	✗																1
100. Cummings *et al.*[215]						✗											1
101. Smith and Jones[140]						✗											1
102. Gonzalez-Torres *et al.*[170]					✗												1
103. Abderhalden *et al.*[113]								✗									1
104. Donat[278]			✗														1
105. Friedman *et al.*[131]			✗														1
106. Parasurum *et al.*[77]												✗					1
107. Donat[220]												✗					1
108. Stensgaard *et al.*[255]	✗																1
109. Newman *et al.*[203]	✗																1
Total	86	47	45	40	38	32	29	26	23	22	18	17	17	8	8	7	

Appendix 12 Non-randomised evaluations ($n = 85$)

Non-controlled evaluations

Author(s)	Wards	Significant outcomes
1. Aremu[151]	1 ward	None
2. Ash *et al.*[6]	10 beds/1 unit	Reduced seclusion episodes
3. Ash *et al.*[117]	10 beds/1 unit	Reduced seclusion episodes
4. Beaglehole *et al.*[223]	64 beds/1 service	Seclusion duration went down
5. Beckett *et al.*[130]	27 beds (6/HDU and 21/acute)	Seclusion rates reduced, use of security staff decreased
6. Bell and Gallacher[161]	30 beds/1 ward	Restraint use went down
7. Björkdahl *et al.*[129]	41 wards/8 hospitals (12–18 beds each)	Significantly more positive attitudes from staff after training
8. Björkdahl *et al.*[279]	28 beds/1 ward reducing to 12 mid-study	Increase in restrictive practices but likely to be confounded by bed reduction
9. Blair[222]	120 beds/1 service	Decreased seclusion events but duration increased, duration of restraint increased
10. Bowers *et al.*[101]	18 beds/2 wards	Reductions in conflict only
11. Brown *et al.*[154]	50 beds/3 wards	Decreased incidents and staff injury
12. Bybel[71]	NR	Relationship between staff training and decrease s/r
13. Cabral and Carthy[15]	6 wards	Improved ward atmosphere
14. Calabro *et al.*[141]	12 wards/1 hospital	Improved attitudes, behavioural intention, self-efficacy
15. Chandler[201]	1 ward	Decrease in s/r
16. Chang *et al.*[162]	24 beds/1 unit	Decrease in s/r
17. Ching *et al.*[115]	118 beds/5 units	Reduction in total number and duration of seclusion
18. Clark *et al.*[114]	11 beds/PICU; 80 beds/centre; 2 units/centre of 92 beds	Reduced seclusion
19. Cowin *et al.*[163]	NR	None
20. Donat[106]	1 hospital	Reduced seclusion restraint and PRN
21. Donat [220]	245 beds/1 hospital	As staff ration increased s/r decreased
22. Donat[278]	310 bed/1 hospital	Reduced PRN use
23. D'Orio *et al.*[149]	1 unit	Reduced seclusion and restraint 39%
24. Fletcher and Stevenson[276]	2 wards	67% decrease in restraint
25. Fluttert *et al.*[118]	16 wards	Significant decrease in seclusions
26. Forster *et al.*[234]	83 beds/1 facility	Significant decrease in restraint
27. Friedman *et al.*[131]	500 beds/6 units plus cottages/ 1 hospital	Reduction in psychotropic PRN and seclusion and restraint

Author(s)	Wards	Significant outcomes
28. Geoffrion *et al.*[148]	24 beds/2 ward (12 beds/PICU plus 12 beds/emergency)	Decrease in seclusion and restraints in PICU only not emergency department
29. Georgieva *et al.*[150]	4 beds/1 unit	Reduced seclusion
30. Godfrey *et al.*[210]	216/2 units (140/acute plus 76/transition) in 398-bed hospital	Mechanical restraint staff injuries all reduced
31. Gonzalez-Torres *et al.*[170]	42 beds/1 ward	Restraint use went down
32. Goulet *et al.*[166]	27 beds	Reduction in seclusion events and duration
33. Guzman-Parra *et al.*[144]	42 beds/1 ward	Reduction in restraint
34. Guzman-Parra *et al.*[146]	42 beds/1 ward	Reduced duration but not rate
35. Hayes and Russ[143]	206 beds/9 units	Reduced PRN – did not increase restraint seclusion or assaults
36. Hellerstein *et al.*[145]	58 beds/3 units	Reduced s/r
37. Hernandez *et al.*[99]	326 beds/1 facility	Reduced s/r
38. Hochstrasser *et al.*[111]	260 beds/15 wards	Seclusion and forced medications decreased
39. Hochstresser *et al.*[111]	4 wards	Yes – decreased frequency of seclusions
40. Huckshorn[92]	350 beds	NR
41. Jonikas *et al.*[180]	3 units/1 hospital	Reduction of physical restraint
42. Jungfer *et al.*[109]	277 beds/1 service	Reduced seclusion and forced medication on open wards
43. Khadivi *et al.*[275]	NR	Reduced seclusion and restraint and increased assaults
44. Lee *et al.*[127]	30/1 unit	Reduction in seclusion
45. Lewis[132]	88 beds/5 units/1 facility of 900 beds	75% reduction in S/R
46. Lo[74]	100 beds/5 units/1 hospital of 454 beds (each 20 beds)	No significant findings
47. Lombardo *et al.*[159]	20 wards	Reduced restraint
48. Long *et al.*[147]	40 beds/3 wards/1 facility	Less seclusion and less time in seclusion
49. Maguire *et al.*[116]	116 beds/5 units	Reduction in frequency and duration of seclusion
50. Maguire *et al.*[197]	20 beds/1 ward/1 hospital of 116 beds	None
51. Mann-Poll *et al.*[212]	5 wards/1 hospital	Decreased rate and duration of seclusion immediately but not later
52. Martin and Suane[231]	NR	Increase in knowledge and use of *Sensory Rooms*
53. McCue *et al.*[237]	135 beds/1 hospital	Reduced restraint
54. McEvedy *et al.*[137]	NR	Positive qualitative results
55. Mistral *et al.*[189]	14 beds/3 wards/1 hospital	Reduction in seclusion
56. Needham *et al.*[112]	24 beds/2 wards/1 hospital (12 plus 12)	On some analysis rates of coercion went down
57. Newman *et al.*[203]	1 unit	None
58. Noorthoorn *et al.*[221]	68 wards/8 hospitals in 2008 increasing to 1826 wards/66 hospitals in 2013	Seclusion decreased; forced medications increased

Author(s)	Wards	Significant outcomes
59. Novak *et al.*[183]	40 beds/1 unit	None
60. Pollard *et al.*[274]	1 unit	Reduced s/r
61. Prescott *et al.*[128]	36 beds (22/adult plus 14/observation) in 1 hospital	None
62. Qurashi *et al.*[186]	1 hospital	Reduced seclusion
63. Repique *et al.*[187]	192 beds	None
64. Riahi *et al.*[23]	326 beds/1 facility	None
65. Riemer and Corwith[192]	21 beds/1 unit	Reduced s/r incidents and duration
66. Sarkar[78]	NR	Not reported
67. Short *et al.*[157]	200 beds/1 facility	Reduced seclusion restrain injury and fewer complaints
68. Smith and Millar[158]	30 beds/1 ward	Not reported
69. Smith *et al.*[142]	9 hospitals	Rate and duration of seclusion/r dropped
70. Smith and Jones[140]	1 ward	None
71. Stead *et al.*[188]	NR	Seclusion reduced
72. Steinert *et al.*[20]	18 beds/1 ward	Seclusion and restraint fell but not mechanical restraint for PD in one setting
73. Stensgaard *et al.*[255]	26 wards	Decrease in coercive measure in general, and forced sedation
74. Sullivan *et al.*[104]	8 beds/1 unit	Reduced duration rather than number of seclusions
75. Sullivan *et al.*[190]	117 beds/5 units/1 hospital of 525 beds	Reduction in seclusion
76. Sutton *et al.*[152]	NR	Positive qualitative findings
77. Taxis[227]	86 beds/1 facility	Reduction in s/r
78. Taylor and Brown[94]	30 beds/1 unit	No detail
79. Taylor-Watt *et al.*[153]	76 beds/6 wards	Reduction in violence restraint down 60%
80. Tully *et al.*[90]	NR	Reduced seclusion
81. Wieman *et al.*[211]	50–200 beds/43 facilities	Yes
82. Wolfaardt[75]	32 beds/1 unit	Not significant
83. Yakov *et al.*[185]	20 beds/1 ward/1 facility	Reduction in restraints and assaults
84. Yang *et al.*[277]	4 wards	None
85. Zuehlke *et al.*[160]	15 beds/1 ward	Yes

PD, personality disorder; s/r, seclusion and restraint.

Non-randomised evaluations with a controlled design ($n = 18$)

Author(s)	Design	Wards	Control	Significant findings
1. Andersen *et al.*[135]	Case control	2 wards	NR	Restraint and PRN decreased (95% CI)
2. Beezhold *et al.*[79]	Quasi-experimental	NR	NR	Restraint and observation decreased (non-significant)
3. [a]Borckardt *et al.*[107]	Experimental design	5 units	Pre-intervention wards as own control	Seclusion and restraint decreased ($p = 0.008$)
4. [a]Boumans *et al.*[225]	Experiment, explorative	4 wards	Other wards with restrictive practice reduction initiatives taking place	Seclusion increased
5. Bowers *et al.*[102]	Non-randomised controlled trial, before/after including action research	8 wards	NR	No significant findings
6. Burhan *et al.*[80]	Pre–post	3 wards	NR	PRN use decreased ($p = < 0.0001$)
7. Cummings *et al.*[215]	Non-randomised controlled trial	NR	NR	No significant findings
8. Duxbury *et al.*[22]	Pre–post, controlled trial	14 wards	Non-matched wards	Overall rate of restraint reduced by an average of 22%
9. Fletcher *et al.*[181]	Pre–post	44 wards	NR	Seclusion decreased ($p = 0.04$)
10. Gonzalez[70]	Quasi-experimental, quantitative study	2 units	NR	No restrictive practice outcomes reported
11. Laker *et al.*[21]	Pre–post, quasi-experimental	NR	NR	No restrictive practice outcomes reported
12. Lloyd *et al.*[136]	Pre–post	40 beds/1 hospital (2 × 20 beds (14 acute and 6 PICU)	NR	Decreased seclusion ($p < 0.001$)
13. [a]Madan *et al.*[108]	Experimental naturalistic design, follow-up	5 units	NR	Seclusion and restraint decreased ($p < 0.001$)
14. Mann-Poll *et al.*[209]	Pre–post	4 wards	Other professionals	No restrictive practice outcomes reported
15. Melin[69]	Pre–post measures, quasi-experimental	3 wards	NR	No restrictive practice outcomes reported
16. Noorthoorn *et al.*[182]	Prospective cohort	2 wards	NR	Seclusion decreased
17. Omolewa[73]	Non-randomised controlled trial	4 units	NR	No restrictive practice outcomes reported
18. Price *et al.*[194]	Non-randomised controlled trial	6 units	Treatment as usual then *Safewards*	Seclusion (including duration) (95% CI 0.78 to 0.92; $p < 0.001$), restraint (including duration) and observation decreased (95% CI 0.86 to 0.90; $p < 0.001$)

CI, confidence interval.
a Randomised.

Appendix 13 Outcome measures

	Incidence								Duration				
Author(s)	Seclusion	Restraint	Chemical	Generic	Violence	Self-harm	Injury	Staff sickness/ absence	Seclusion	Restraint	Generic	Other	Total
1. Abderhalden *et al.*[113]				α	✗							✗	3
2. Andersen *et al.*[135]		α	α									S	2
3. Aremu *et al.*[151]			ED									S	2
4. Ash *et al.*[117]	αEP												1
5. Ash *et al.*[6]	αEP												1
6. Beaglehole *et al.*[223]	✗				✗								2
7. Beckett *et al.*[130]	✗												1
8. Beezhold *et al.*[79]		αE			E							E	3
9. Bell and Gallacher[161]				✗S									1
10. Björkdahl *et al.*[129]		✗					✗						2
11. Björkdahl *et al.*[279]												S	1
12. Blair *et al.*[222]	✗	✗			S				✗	✗			4
13. Borckardt *et al.*[107]	α	α										S	2
14. Boumans *et al.*[225]	S[a]											✗	2
15. Bowers *et al.*[102]				✗									1
16. Bowers *et al.*[16]				α									1
17. Bowers *et al.*[101]				✗									1
18. Brown *et al.*[154]		αE					αE	E				E	4
19. Burhan *et al.*[80]			α									✗	2
20. Bybel[71]	α	α											2
21. Cabral and Carthy[15]												S	1
22. Calabro *et al.*[141]												✗	1
23. Chandler[201]	✗	✗											2
24. Chang *et al.*[162]	α	α										S	3

Author(s)	Incidence								Duration				
	Seclusion	Restraint	Chemical	Generic	Violence	Self-harm	Injury	Staff sickness/ absence	Seclusion	Restraint	Generic	Other	Total
25. Ching *et al.*[115]	✗				✗							S	3
26. Clarke *et al.*[114]	✗				SP								2
27. Cowin *et al.*[163]												D	1
28. Cummings *et al.*[215]	✗	✗							✗	✗			4
29. Donat[106]	✗P	✗P									✗		3
30. Donat[220]	✗	✗	✗										3
31. Donat[278]			✗										1
32. D'Orio *et al.*[218]	α	α			✗								3
33. Duxbury *et al.*[22]		E											1
34. Fletcher and Stevenson[276]		✗			✗	✗							3
35. Fletcher *et al.*[181]	α												1
36. Fluttert *et al.*[118]	α											D	2
37. Forster *et al.*[234]	✗						✗						2
38. Friedman *et al.*[131]	✗	✗	D		✗								4
39. Geoffrion *et al.*[148]	✗	✗							✗	✗			4
40. Georgieva *et al.*[150]				✗					✗				2
41. Godfrey *et al.*[210]	E	E	E		E								4
42. Gonzalez[70]		E NR											1
43. Gonzalez-Torres *et al.*[170]				✗									1
44. Goulet *et al.*[166]	✗	✗							✗	✗			4
45. Guzman-Parra *et al.*[146]		✗								α			2
46. Guzman-Parra *et al.*[144]		✗								✗			2
47. Hayes and Russ[143]	✗	✗	α		✗								3
48. Hellerstein *et al.*[145]	✗P	✗P			✗		✗		✗	✗			6

Author(s)	Incidence								Duration				
	Seclusion	Restraint	Chemical	Generic	Violence	Self-harm	Injury	Staff sickness/ absence	Seclusion	Restraint	Generic	Other	Total
49. Hernandez *et al.*[99]				E					E	E			3
50. Hochstrasser *et al.*[111]	E		E										2
51. Hochstrasser *et al.*[111]	EP		EP	E									3
52. Huckshorn[92]	✗	✗	✗						✗	✗		✗	6
53. Jonikas *et al.*[180]		E											1
54. Jungfer *et al.*[109]	αE		αE										2
55. Khadivi *et al.*[275]	E	E			E								3
56. Kontio *et al.*[199]	E	αE							E	E			4
57. Laker *et al.*[21]		E NR										E	2
58. Lee *et al.*[127]	αD											S	1
59. Lewis *et al.*[132]	αE	αE					E		E	E		S	5
60. Lloyd *et al.*[136]	α								✗			S	3
61. Lo[74]													0
62. Lombardo *et al.*[159]		D										D	2
63. Long *et al.*[147]	α											S	1
64. Madan *et al.*[108]	αE	αE											2
65. Maguire *et al.*[116]	XP								✗			S	2
66. Maguire *et al.*[197]				✗								S	2
67. Mann-Poll *et al.*[209]	✗		✗										2
68. Mann-Poll *et al.*[212]												S	1
69. Martin *et al.*[231]	✗	✗										DS	2
70. McCue *et al.*[237]				✗	✗	✗							3
71. McEvedy *et al.*[137]												✗	1
72. Melin[69]			NR										1
73. Mistral *et al.*[189]	✗							S				S	3

Author(s)	Incidence								Duration				
	Seclusion	Restraint	Chemical	Generic	Violence	Self-harm	Injury	Staff sickness/ absence	Seclusion	Restraint	Generic	Other	Total
74. Needham *et al.*[112]					D								1
75. Newman *et al.*[203]	E								E			E	3
76. Noorthoorn *et al.*[182]	α			✗									1
77. Noorthoorn *et al.*[221]	α			✗									1
78. Novak *et al.*[183]	✗												1
79. Omolewa[73]												S	1
80. Parasurum *et al.*[77]		NR			✗							S	3
81. Pollard *et al.*[274]				✗									1
82. Prescott *et al.*[128]		✗											1
83. Price *et al.*[194]	α			S								S	1
84. Putkonen *et al.*[17]	α	α		✗				✗					2
85. Qurashi *et al.*[81]				✗									1
86. Repique *et al.*[187]				✗									1
87. Riahi *et al.*[23]	ESP	ESP							ES	ES			4
88. Riemer *et al.*[192]	✗	✗											2
89. Sarkar[78]		✗	✗		✗	✗							4
90. Short *et al.*[157]	α	α			✗		α					✗	4
91. Smith and Millar[140]	D	D					D		D	D		S	5
92. Smith and Jones[158]													0
93. Smith *et al.*[142]	αP								✗			✗	3
94. Stead *et al.*[188]												✗	1
95. Steinert *et al.*[20]	EP	EP							EP	EP			4
96. Stensgaard *et al.*[255]		EP	E	E									3
97. Sullivan *et al.*[190]	✗	✗	✗		✗	✗			✗			✗	7
98. Sullivan *et al.*[104]				✗									1

	Incidence								Duration				
Author(s)	Seclusion	Restraint	Chemical	Generic	Violence	Self-harm	Injury	Staff sickness/ absence	Seclusion	Restraint	Generic	Other	Total
99. Sutton *et al.*[152]												S	1
100. Taxis[227]				✗									1
101. Taylor *et al.*[94]	✗												1
102. Taylor-Watt *et al.*[153]	✗	✗						✗				S	3
103. Tully *et al.*[90]									✗			DS	2
104. van de Sande *et al.*[200]	αSP				SD				S				3
105. Wieman *et al.*[211]	✗	✗							✗	✗		S	4
106. Wolfaardt[75]	✗	✗										S	3
107. Yakov *et al.*[185]		αE			αE					E			2
108. Yang *et al.*[277]	✗	✗										✗	3
109. Zuehlke *et al.*[160]	✗	✗										✗	3
Total	56	48	16	23	20	4	6	4	22	16	1	33	

α, Significant findings; D, developed; E, existing records; P, number or % of service users; S, standardised; ✗, outcome measure used.
a Increased.

Standardised outcome measures	*n*
AAPPQ[280]	1
Adult/Adolescent Sensory Profile (Brown and Dunn[281])	2
Argus Scale[200]	2
Attitudes towards working with people with psychosis (McLeod *et al.*[282])	1
Behavioural Profile Tool	1
BPRS[283]	1
Brøset Violence Checklist[206]	4
Client Satisfaction Questionnaire[284]	1
Confidence in Managing Inpatient Aggression Survey (Martin and Daffern[285])	2
CT-R Interview (Chang *et al.*[162])	1
Dangerousness Scale[286]	1
DREEM[287]	1
Dynamic Appraisal of Situational Aggression Risk Assessment (Ogloff and Daffern[288])	1
Emotions Activity Rating Scale (Champagne and Stromberg[289])	1
EssenCES (Schalast *et al.*[207])	4
General Aggression Model (Allen *et al.*[290])	1
Heyman Staff Attitudes towards Seclusion Survey (Heyman[204])	3
HoNOS[291]	1
Inpatient behaviour rating scale (Dolan)[292]	1
ISRRI: fidelity measure[211]	1
Kennedy-Axis V[293]	1
Knowledge of Physical Restraint Use, Attitudes of Physical Restraint Use, and Practice of Physical Restraint Use (Huang *et al.*[294])	1
Maslach Burnout Inventory[295]	1
Mental Status Assessment[296]	1
Nursing staff questionnaire	1
Overt Aggression Scale (Yudofsky *et al.*[297])	1
Patient Safety Climate Tool[161]	2
PCC-SR[298]	3
Presencia tool to measure risk of restraint (Guzman-Parra *et al.*[144])	1
PATS-Q[209]	1
Q-LES-Q-SF[299]	1
Quality of Care measure[300]	1
Safewards Implementation Audit Checklist, *Safewards Researcher Visit Fidelity Checklist*[16]	2
Social Dysfunction and Aggression Scale[301]	1
SOAS-R[302]	1
Tidal Monitoring Assessment Tool[303]	1
VOTE (Laker *et al.*[304])	1
Violence prevention and management climate via 'E13' a 13-item questionnaire[305]	1
Ward atmosphere scale[306]	1

AAPPQ, Alcohol and alcohol problems perception questionnaire; BPRS, Brief Psychiatric Rating Scale; CT-R, Recovery-Oriented Cognitive Therapy; DREEM, Developing Recovery Enhancing Environments Measure; HoNOS, Health of the Nation Outcome Scales; PATS-Q, Professionals' Attitude Towards Seclusion Questionnaire; Q-LES-Q-SF, Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form; VOTE, Views on Therapeutic Environments.

Appendix 14 Individual behaviour change techniques not used

Grouping	BCT
Feedback and monitoring	2.6 Biofeedback
Shaping behaviour	4.3 Re-attribution
	4.4 Behavioural experiments
Natural consequences	5.5 Anticipated regret
Associations	7.2 Cue signalling reward
	7.3 Reduce prompts or cues
	7.4 Remove access to reward
	7.5 Remove aversive stimulus
	7.6 Satiation
	7.7 Exposure
	7.8 Associative learning
Repetition and substitution	8.2 Behavioural substitution
	8.5. Overcorrection
	8.6. Generalisation of target behaviour
	8.7. Graded tasks
Comparison of outcomes	9.2. Pros and cons
	9.3. Comparative imagining of future outcomes
Reward and threat	10.1. Material incentive (behaviour)
	10.2. Material reward (behaviour)
	10.3. Non-specific reward
	10.5. Social incentive
	10.6. Non-specific incentive
	10.7. Self-incentive
	10.8. Incentive (outcome)
	10.9. Self-reward
	10.10. Reward (outcome)
	10.11. Future punishment
Regulation	11.1. Pharmacological support
	11.3. Conserving mental resources
	11.4. Paradoxical instructions

Grouping	BCT
Antecedents	12.3. Avoidance/reducing exposure to cues for the behaviour
	12.4. Distraction
	12.6. Body changes
Identity	13.3. Incompatible beliefs
	13.4. Valued self-identify
	13.5. Identity associated with changed behaviour
Scheduled consequences	14.1. Behaviour cost
	14.2. Punishment
	14.3. Remove reward
	14.4. Reward approximation
	14.5. Rewarding completion
	14.6. Situation-specific reward
	14.7. Reward incompatible behaviour
	14.8. Reward alternative behaviour
	14.9. Reduce reward frequency
	14.10. Remove punishment
Self-belief	15.1. Verbal persuasion about capability
	15.2. Mental rehearsal of successful performance
	15.3. Focus on past success
	15.4. Self-talk
Covert learning	16.1. Imaginary punishment
	16.2. Imaginary reward
	16.3. Vicarious consequences

Appendix 15 Behaviour change techniques identified in evaluations of interventions that reduced restrictive practices

Author(s)	Instruction on how to perform the behaviour	Restructuring the social environment	Problem-solving	Action-planning	Framing/ reframing	Prompts or cues	Feedback: outcome(s) of behaviour	Information about antecedents	Adding objects to the environment	Social support (practical)	Restructuring the physical environment
1. **Abderhalden *et al.***[113]	0	1	1	1	0	1	0	0	0	0	0
2. **Andersen *et al.***[135]	1	0	1	1	0	1	0	0	1	0	0
3. Aremu *et al.*[151]	1	1	0	0	1	0	0	0	0	0	0
4. **Ash *et al.***[117]	1	1	1	1	1	0	1	0	1	0	1
5. **Ash *et al.***[6]	0	0	1	1	1	0	1	0	0	0	0
6. Beaglehole *et al.*[223]	0	1	0	0	0	0	1	0	0	0	1
7. Beckett *et al.*[130]	1	1	0	0	1	0	1	0	0	1	1
8. Beezhold *et al.*[79]	0	1	0	1	0	0	0	0	0	0	0
9. Bell and Gallacher[161]	1	0	1	1	1	0	1	0	1	0	0
10. Blair *et al.*[222]	1	1	1	1	1	1	1	0	1	0	1
11. **Borckardt *et al.***[107]	1	1	1	1	1	0	0	1	0	0	1
12. **Bowers *et al.***[16]	1	1	0	1	1	1	0	0	1	0	0
13. **Burhan *et al.***[80]	0	0	0	0	1	0	0	0	0	0	0
14. **Bybel**[71]	1	0	0	0	0	0	0	0	0	0	0
15. Chandler[201]	1	1	1	1	1	1	1	1	1	1	0
16. **Chang *et al.***[162]	1	0	0	1	1	0	0	0	0	0	0
17. Ching *et al.*[115]	1	1	1	1	0	1	1	0	1	0	1
18. Clarke *et al.*[114]	0	0	1	0	0	1	1	0	0	0	0
19. **D'Orio *et al.***[149]	1	1	1	1	0	0	0	1	1	1	0
20. Donat[106.220]	1	1	1	1	0	1	1	0	0	0	0
21. Donat[278]	0	0	1	1	0	0	1	0	0	0	0
22. Donat[220]	0	1	0	0	0	0	0	0	0	0	0
23. Duxbury *et al.*[22]	1	1	1	1	1	0	1	0	1	0	0

Author(s)	Instruction on how to perform the behaviour	Restructuring the social environment	Problem-solving	Action-planning	Framing/ reframing	Prompts or cues	Feedback: outcome(s) of behaviour	Information about antecedents	Adding objects to the environment	Social support (practical)	Restructuring the physical environment
24. Fletcher and Stevenson[276]	0	0	1	0	1	0	0	0	0	0	0
25. **Fletcher *et al.***[181]	1	1	1	1	1	1	0	0	1	0	0
26. **Fluttert *et al.***[118]	1	0	1	1	0	1	0	1	0	0	0
27. Forster *et al.*[234]	1	1	0	0	1	0	0	1	0	0	0
28. Friedman *et al.*[131]	0	0	1	1	0	0	1	0	0	0	0
29. Geoffrion *et al.*[148]	1	0	0	0	0	0	0	0	0	0	0
30. Georgieva *et al.*[150]	1	1	1	1	1	1	1	1	1	0	1
31. Godfrey *et al.*[210]	1	1	0	1	1	0	0	1	0	1	0
32. Gonzalez[70]	1	0	0	0	0	0	0	0	0	0	0
33. Goulet *et al.*[166]	1	1	1	1	0	1	1	1	0	1	0
34. Guzman Parra *et al.*[146]	0	1	0	0	0	0	1	0	0	0	0
35. Guzman-Parra *et al.*[144]	1	1	1	1	0	1	1	1	0	0	0
36. **Hayes and Russ**[143]	0	1	0	0	0	0	0	0	0	0	0
37. Hernandez *et al.*[99]	0	1	1	1	1	0	1	0	0	0	0
38. Hochstrasser *et al.*[111]	1	1	0	0	1	0	0	0	0	0	1
39. Hochstrasser *et al.*[111]	0	1	0	0	1	0	0	0	0	0	0
40. Jonikas *et al.*[180]	1	0	1	1	0	0	1	1	0	0	0
41. **Jungfer *et al.***[109]	1	1	0	0	0	0	0	0	0	0	1
42. Khadivi *et al.*[275]	1	0	1	0	0	0	0	1	0	0	0
43. **Kontio *et al.***[199]	1	0	0	0	1	0	0	1	0	1	0
44. **Lee *et al.***[127]	1	0	1	1	0	1	0	1	1	0	0
45. **Lewis *et al.***[132]	1	1	1	1	1	1	1	1	1	1	0
46. Lloyd *et al.*[136]	1	1	0	1	0	1	0	0	1	0	1

Author(s)	Instruction on how to perform the behaviour	Restructuring the social environment	Problem-solving	Action-planning	Framing/ reframing	Prompts or cues	Feedback: outcome(s) of behaviour	Information about antecedents	Adding objects to the environment	Social support (practical)	Restructuring the physical environment
47. Lombardo *et al.*[159]	1	1	1	1	0	0	1	1	0	0	1
48. Long *et al.*[147]	1	1	1	1	1	1	0	0	1	0	0
49. **Madan *et al.***[108]	1	1	1	0	1	1	0	0	1	0	1
50. Maguire *et al.*[116]	1	1	1	0	1	1	1	1	1	0	1
51. Mann Poll *et al.*[212]	1	1	1	1	0	1	1	1	0	1	1
52. McCue *et al.*[237]	1	1	1	1	0	0	0	0	0	1	0
53. Mistral *et al.*[189]	1	1	1	1	0	1	0	0	1	1	1
54. Needham *et al.*[112]	1	0	1	0	0	1	0	0	0	1	0
55. Newman *et al.*[203]	1	0	0	0	0	1	0	0	0	0	0
56. **Noorthoorn *et al.***[221]	1	1	1	0	0	0	1	1	0	1	0
57. Novak *et al.*[183]	1	0	0	0	0	0	0	0	1	0	1
58. Pollard *et al.*[274]	1	1	1	0	0	0	1	0	0	0	0
59. **Price *et al.***[194]	1	1	1	0	0	1	0	1	1	1	0
60. **Putkonen *et al.***[17]	1	1	1	1	0	1	1	1	0	1	0
61. Qurashi *et al.*[186]	1	1	1	1	1	0	1	0	0	1	0
62. Repique *et al.*[187]	1	1	1	0	1	0	0	0	0	0	0
63. Riahi *et al.*[23]	1	1	1	1	1	1	1	1	1	1	0
64. Sarkar *et al.*[78]	1	1	1	0	0	0	0	0	0	0	0
65. **Short *et al.***[157]	1	1	1	1	1	1	0	1	0	0	0
66. Sivak[191]	0	1	0	0	0	1	1	0	1	0	1
67. Smith and Millar[140]	0	1	0	0	0	0	0	0	1	0	1
68. Smith and Millar[158]	0	1	1	0	0	1	0	0	1	0	1
69. **Smith *et al.***[142]	1	1	1	1	1	0	1	0	0	1	0
70. Stead *et al.*[188]	1	0	1	1	0	1	1	0	1	1	0

Author(s)	Instruction on how to perform the behaviour	Restructuring the social environment	Problem-solving	Action-planning	Framing/ reframing	Prompts or cues	Feedback: outcome(s) of behaviour	Information about antecedents	Adding objects to the environment	Social support (practical)	Restructuring the physical environment
71. Steinert *et al.*[20]	0	1	1	0	0	0	0	0	0	0	1
72. Stensgaard *et al.*[255]	0	1	0	0	1	0	0	0	0	0	0
73. Sullivan *et al.*[104]	1	0	1	0	0	1	0	0	0	1	0
74. Sullivan *et al.*[104]	1	1	1	0	1	1	0	1	0	0	0
75. Taxis *et al.*[227]	1	1	1	1	1	1	1	1	1	1	1
76. Tully *et al.*[90]	1	1	1	1	0	0	0	0	0	0	0
77. **van de Sande *et al.***[200]	1	0	1	1	0	1	0	1	0	1	0
78. Wieman *et al.*[211]	1	1	1	0	0	1	1	0	0	0	0
79. Wolfaardt[75]	1	1	1	1	1	1	1	1	0	1	1
80. **Yakov *et al.***[185]	1	1	1	1	0	1	0	1	1	0	0
81. Yang *et al.*[277]	1	1	0	0	1	0	0	0	0	0	0
82. Zuehlke *et al.*[160]	1	1	1	1	1	0	0	0	0	0	0

Studies reporting statistical significance in bold.

Appendix 16 Full list of records included in the review

Author(s)	Title
1. Abderhalden *et al.*[113]	Structured risk assessment and violence in acute psychiatric wards: randomised controlled trial
2. AHRQ[198]	*Multipronged Strategy Reduces Use of Seclusion and Restraints to Manage Aggression at Inpatient Behavioral Health Facility*
3. Alberta Health Services[230]	*Restraint as a Last Resort Flowchart*
4. Allen *et al.*[238]	Executive-level reviews of seclusion and restraint promote interdisciplinary collaboration and innovation
5. Andersen *et al.*[135]	Applying sensory modulation to mental health inpatient care to reduce seclusion and restraint: a case control study
6. Health PEI	*Alegent Health: Trauma Informed Care, Transforming Our Future*
7. American Hospital Association[259]	*Learning From Each Other: Success Stories and Ideas for Reducing Restraint/ Seclusion in Behavioral Health*
8. American Psychiatric Nurses Association[232]	*2017-Seclusion and Restraint: Assessment and Risk Mitigation*
9. AQUA[121]	*REsTRAIN Yourself* toolkit
10. Aremu *et al.*[151]	Implementation of trauma-informed care and brief solution-focused therapy
11. Tully[251]	A pilot evaluation of strategies to reduce long term segregation on Ascot Ward, Broadmoor
12. Ash *et al.*[117]	Reduction in the use of seclusion with the introduction of recovery principles in an acute psychiatric unit
13. Ash *et al.*[6]	Recovery-based services in a psychiatric intensive care unit – the consumer perspective
14. Ashcraft and Anthony[193]	Eliminating seclusion and restraint in recovery-oriented crisis services
15. Ashcraft *et al.*[24]	Best practices: the development and implementation of 'no force first' as a best practice
16. Barton *et al.*[184]	Achieving restraint-free on an inpatient behavioral health unit
17. Beaglehole *et al.*[223]	Unlocking an acute psychiatric ward: the impact on unauthorised absences, assaults and seclusions
18. Beckett *et al.*[130]	Trauma-informed care and practice: practice improvement strategies in an inpatient mental health ward
19. Beezhold *et al.*[79]	A quasi-experimental controlled intervention to reduce violence on an acute psychiatric ward
20. Belanger[307]	The 'S and R challenge': reducing the use of seclusion and restraint in a state psychiatric hospital
21. Bell and Gallacher[161]	Succeeding in sustained reduction in the use of restraint using the Improvement Model
22. ST-ACS Team[267]	*ST-ACS Positive Behaviour Support (PBS) Training*
23. Björkdahl *et al.*[129]	The influence of staff training on the violence prevention and management climate in psychiatric inpatient units
24. Björkdahl *et al.*[279]	Changes in the occurrences of coercive interventions and staff injuries on a psychiatric intensive care unit

Author(s)	Title
25. Blair *et al.*[308]	Reduction of seclusion and restraint in an inpatient psychiatric setting: a pilot study
26. Blair and Moulton-Adelman[222]	The Engagement Model for reducing seclusion and restraint: 13 years later
27. Borckardt *et al.*[107]	Systematic investigation of initiatives to reduce seclusion and restraint in a state psychiatric hospital
28. Boumans *et al.*[225]	Seclusion and the importance of contextual factors: an innovation project revisited
29. Bowers *et al.*[101]	Preliminary outcomes of a trial to reduce conflict and containment on acute psychiatric wards: City Nurses
30. Bowers *et al.*[102]	A replication study of the City Nurse intervention: reducing conflict and containment on three acute psychiatric wards
31. Bowers *et al.*[16]	Reducing conflict and containment rates on acute psychiatric wards: the Safewards cluster randomised controlled trial
32. Brown *et al.*[154]	Safer wards: reducing violence on older people's mental health wards
33. Burhan *et al.*[80]	The impact of a primary nursing care delivery approach upon the frequency and effectiveness of PRN medication
34. Bybel[71]	*Does Education of Alternative Measures Decrease the Use of Physical Restraints and Seclusion?*
35. Cabral and Carthy[15]	Can Safewards improve patient care and safety in forensic wards? A pilot study
36. Calabro *et al.*[141]	Evaluation of training designed to prevent and manage patient violence
37. CQC[85]	Example 1: improved leadership and governance [example 1 of 5]
38. Chabora *et al.*[208]	The Four S Model in action for de-escalation: an innovative state hospital–university collaborative endeavor
39. Chandler[201]	Reducing use of restraints and seclusion to create a culture of safety
40. Chang *et al.*[162]	Effects of a recovery-oriented cognitive therapy training program on inpatient staff attitudes and incidents of seclusion and restraint
41. Cheema *et al.*[124]	Improving patient safety in mental health through quality risk management
42. Ching *et al.*[115]	Reducing the use of seclusion in a forensic psychiatric hospital: assessing the impact on aggression, therapeutic climate and staff confidence
43. Duxbury *et al.*[22]	Minimising the use of physical restraint in acute mental health services: the outcome of a restraint reduction programme ('REsTRAIN YOURSELF')
44. Hart[93]	*Using De-escalation Skills in a Mental Health Setting: Twenty First Century Media*
45. Clark *et al.*[217]	*Behavioural Support Chart*
46. Clark *et al.*[217]	Reducing restrictive practice: developing and implementing behavioural support plans
47. Clarke *et al.*[114]	The Brøset Violence Checklist: clinical utility in a secure psychiatric intensive care setting
48. Cockerton *et al.*[195]	Implementing positive and proactive care
49. Colton[176]	*Checklist for Assessing your Organization's Readiness for Reducing Seclusion and Restraint*
50. Cowin *et al.*[163]	De-escalating aggression and violence in the mental health setting
51. CPI[95]	*De-escalation Techniques*
52. Cummings *et al.*[215]	Caring with comfort rooms: reducing seclusion and restraint use in psychiatric facilities
53. D.Escal8[260]	*PBS and De-escalation: Developing Positive Relationships, Supporting Those in Distress*

Author(s)	Title
54. DMHAS[138]	*DMHAS Guidelines for Development of Comfort Rooms*
55. Dewey and Brill[309]	Decrease in restraint use in a study of a geropsychiatric unit
56. Donat[106]	Employing behavioral methods to improve the context of care in a public psychiatric hospital: reducing hospital reliance on seclusion/restraint and psychotropic PRN medication
57. Donat[278]	Impact of a clinical-administrative review procedure on reducing reliance on psychotropic PRN medication
58. Donat[220]	Impact of improved staffing on seclusion/restraint reliance in a public psychiatric hospital
59. D'Orio *et al.*[149]	Reduction of episodes of seclusion and restraint in a psychiatric emergency service
60. Fletcher and Stevenson[276]	Launching the Tidal Model in an adult mental health programme
61. Fletcher *et al.*[181]	Outcomes of the Victorian Safewards trial in 13 wards: impact on seclusion rates and fidelity measurement
62. Fluttert *et al.*[310]	*Forensic Early Signs of Aggression Inventory [FESAI]*
63. Fluttert *et al.*[119]	*Protocol Early Recognition Method*
64. Fluttert *et al.*[118]	Preventing aggressive incidents and seclusions in forensic care by means of the 'Early Recognition Method'
65. Forster *et al.*[234]	Staff training decreases use of seclusion and restraint in an acute psychiatric hospital
66. Friedman *et al.*[131]	Using structured clinical feedback to encourage alternatives to use of 'P.R.N.' medication in a state psychiatric hospital
67. Geoffrion *et al.*[148]	Impact of a program for the management of aggressive behaviors on seclusion and restraint use in two high-risk units of a mental health institute
68. Georgieva *et al.*[150]	Successful reduction of seclusion in a newly developed psychiatric intensive care unit
69. Godfrey *et al.*[210]	Anatomy of a transformation: a systematic effort to reduce mechanical restraints at a state psychiatric hospital
70. Gonzalez[70]	Impact of active listening training at a California state hospital: a quantitative study
71. Gonzalez-Torres *et al.*[170]	Impact of the creation and implementation of a clinical management guideline for personality disorders in reducing use of mechanical restraints in a psychiatric inpatient unit
72. Goulet *et al.*[166]	A pilot study of 'post-seclusion and/or restraint review' intervention with patients and staff in a mental health setting
73. CPI[97]	*Unrestrained – BERT Team Intervention Approach*
74. Guzman-Parra *et al.*[144]	Effectiveness of a multimodal intervention program for restraint prevention in an acute Spanish psychiatric ward
75. Guzman-Parra *et al.*[146]	Effects of a regulatory protocol for mechanical restraint and coercion in a Spanish psychiatric ward
76. Meeks[96]	*Non-Violent De-escalation for Therapists*
77. Hayashi *et al.*[76]	The elimination of seclusion in a geriatric inpatient unit: using environmental modification to effect a cultural change
78. Hayes and Russ[143]	Discontinuing the use of PRN intramuscular medication for agitation in an acute psychiatric hospital
79. Hellerstein *et al.*[145]	Decreasing the use of restraint and seclusion among psychiatric inpatients
80. Hernandez *et al.*[99]	Multidimensional approach to restraint minimization: the journey of a specialized mental health organization

Author(s)	Title
81. Higgins *et al.*[100]	The Safewards Program in Queensland public hospital acute mental health settings
82. Higgins *et al.*[88]	*Implementation of Safewards Across Three Inpatient Mental Health Units*
83. Hochstrasser *et al.*[110]	Long-term reduction of seclusion and forced medication on a hospital-wide level: implementation of an open-door policy over 6 years
84. Huckshorn[133]	*Six Core Strategies© to Reduce the Use of Seclusion and Restraint Planning Tool*
85. Huckshorn[92]	*Preventing Violence, Trauma, and the Use of Seclusion and Restraint in Mental Health Settings: Real Reduction Experiences – What Worked?*
86. Huckshorn[72]	*Reducing Seclusion and Restraint Use in Mental Health Settings: A Phenomenological Study of Hospital Leader and Staff Experiences*
87. Hyde *et al.*[311]	A clinical improvement project to develop and implement a decision-making framework for the use of seclusion
88. JKM Training, Inc.[261]	*Reducing Restraints*
89. Jonikas *et al.*[180]	A program to reduce use of physical restraint in psychiatric inpatient facilities
90. Jungfer *et al.*[109]	Reduction of seclusion on a hospital-wide level: successful implementation of a less restrictive policy
91. Kayes and Humphris[257]	Introduction of restraint and seclusion reduction program in Margaret Tobin centre
92. Khadivi *et al.*[275]	Association between seclusion and restraint and patient-related violence
93. Kontio *et al.*[199]	eLearning course may shorten the duration of mechanical restraint among psychiatric inpatients: a cluster-randomized trial
94. Laker *et al.*[21]	Case study evaluating the impact of de-escalation and physical intervention training
95. Lee *et al.*[127]	Sensory assessment and therapy to help reduce seclusion use with service users needing psychiatric intensive care
96. Lewis *et al.*[132]	Crisis prevention management: a program to reduce the use of seclusion and restraint in an inpatient mental health setting
97. Lloyd *et al.*[136]	An investigation into the effectiveness of sensory modulation in reducing seclusion within an acute mental health unit
98. Lo[74]	*Implementation of a Psychiatric Emergency Response Team on Adult Psychiatric Inpatient Units*
99. Lombardo *et al.*[159]	PROGRESS: the PROMISE governance framework to decrease coercion in mental healthcare
100. Long *et al.*[147]	Reducing the use of seclusion in a secure service for women
101. Madan *et al.*[108]	Efforts to reduce seclusion and restraint use in a state psychiatric hospital: a ten-year perspective
102. Maguire *et al.*[116]	Seclusion reduction in a forensic mental health setting
103. Maguire *et al.*[197]	Risk assessment and subsequent nursing interventions in a forensic mental health inpatient setting: associations and impact on aggressive behaviour
104. Mann-Poll *et al.*[212]	Long-term impact of a tailored seclusion reduction program: evidence for change?
105. Mann-Poll *et al.*[209]	Professionals' attitudes after a seclusion reduction program: anything changed?
106. Martin and Suane[231]	Effect of training on sensory room and cart usage
107. Maudsley Simulation[312]	*Maudsley Simulation*
108. McCue *et al.*[237]	Reducing restraint use in a public psychiatric inpatient service

Author(s)	Title
109. McEvedy *et al.*[137]	Sensory modulation and trauma-informed-care knowledge transfer and translation in mental health services in Victoria: evaluation of a statewide train-the-trainer intervention
110. McEwan *et al.*[123]	Achieving violence and restraint reduction in an IPCU
111. Melin[69]	*Team Responses to Inpatient Aggression: The Effects of Institutional Training on Restraint Utilization Patterns*
112. Mind[87]	*Restraint in Mental Health Services*
113. Mistral *et al.*[189]	Using therapeutic community principles to improve the functioning of a high care psychiatric ward in the UK
114. Morrow *et al.*[248]	*Alternatives to Seclusion and Restraint SAMHSA State Infrastructure Grant Evaluation Overview*
115. Natale *et al.*[258]	Applying Jean Watson's caring theory to reduce restraint use in the acute psychiatric area
116. Needham *et al.*[112]	The effectiveness of two interventions in the management of patient violence in acute mental inpatient settings: report on a pilot study
117. Newman *et al.*[203]	Effects of a staff training intervention on seclusion rates on an adult inpatient psychiatric unit
118. NHS Improvement[229]	*Mersey Care NHS Foundation Trust – Using the DASA Tool to Assess the Risk of Violence Among Psychiatric Inpatients*
119. Noorthoorn *et al.*[182]	The power of day-to-day motivational techniques and family participation in reducing seclusion
120. Noorthoorn *et al.*[221]	Seclusion reduction in Dutch mental health care: did hospitals meet goals?
121. Novak *et al.*[183]	Pilot study of a sensory room in an acute inpatient psychiatric unit
122. Northumberland Tyne and Wear NHS Foundation Trust[125]	*Positive and Safe Care Annual Report 2017*
123. Northumberland Tyne and Wear NHS Foundation Trust[269]	*Talk 1st Ward Assessment*
124. Northumberland Tyne and Wear NHS Foundation Trust[270]	*Positive and Safe Debrief Policy and Tool*
125. Northumberland Tyne and Wear NHS Foundation Trust[271]	*Positive and Safe Positive Practice Process Outline*
126. Northumberland Tyne and Wear NHS Foundation Trust[83]	*Positive and Safe Care Annual Report 2018*
127. Omolewa[73]	*The Impact of Instructive Educational Program on Physical Restraint Reduction in Acute Mental Health Hospitals*
128. Parasurum *et al.*[77]	A randomised controlled study examining the impact of a staffing model and nursing care delivery system on patient, nurse and organisational outcomes
129. Pollard *et al.*[274]	Organizational and unit factors contributing to reduction in the use of seclusion and restraint procedures on an acute psychiatric inpatient unit
130. Prescott *et al.*[128]	Reducing mechanical restraints in acute psychiatric care settings using rapid response teams
131. Price *et al.*[194]	Evaluation of Safewards in forensic mental health
132. Putkonen *et al.*[17]	Cluster-randomized controlled trial of reducing seclusion and restraint in secured care of men with schizophrenia
133. Qurashi *et al.*[186]	Reduction in the use of seclusion in a high secure hospital: a retrospective analysis
134. RCP[126]	*Reducing Restrictive Practice Programme: Tools – Talk First*

Author(s)	Title
135. Repique *et al.*[187]	Implementation of a recovery-oriented training program for psychiatric nurses in the inpatient setting: a mixed-methods hospital quality improvement study
136. Respect Training[254]	*Respect Training from NAVIGO*
137. Restraint Reduction Network[214]	*Six Key Restraint Reduction Strategies*
138. Riahi *et al.*[23]	Implementation of the Six Core Strategies for restraint minimization in a specialized mental health organization
139. Riemer and Corwith[192]	Application of core strategies: reducing seclusion & restraint use
140. SAMSHA[249]	*Coordinating Center: Alternatives to Restraint & Seclusion (ARS) State Infrastructure Grant (SIG) Program – First Round of ARS SIG Grantees*
141. Sarkar[78]	Reducing violence through the use of structured therapies
142. Scottish Patient Safety Programme[122]	*Patient Safety Including Trauma Informed Care and Usage of Seclusion and Restraint*
143. Scottish Patient Safety Programme[91]	*Restraint and Seclusion Driver Diagram*
144. Short *et al.*[157]	Safety guidelines for injury-free management of psychiatric inpatients in precrisis and crisis situations
145. Sivak[191]	Implementation of comfort rooms to reduce seclusion, restraint use, and acting-out behaviors
146. Smith *et al.*[142]	Pennsylvania State Hospital system's seclusion and restraint reduction program
147. Smith and Millar[158]	The quiet room: improving the acute care psychiatric environment
148. Smith and Jones[140]	Use of a sensory room on an intensive care unit
149. South Australia Health[272]	*Mental Health Restraint and Seclusion Toolkit Fact Sheet 7*
150. Stansgaard *et al.*[255]	Implementation of the Safewards model to reduce the use of coercive measures in adult psychiatric inpatient units: an interrupted time-series analysis
151. Stead *et al.*[188]	Teams communicating through STEPPS
152. Steinert *et al.*[20]	Successful interventions on an organisational level to reduce violence and coercive interventions in in-patients with adjustment disorders and personality disorders
153. Stirling *et al.*[233]	*Reducing Restrictive Practices Checklist*
154. Sullivan *et al.*[190]	Reducing restraints: alternatives to restraints on an inpatient psychiatric service – utilizing safe and effective methods to evaluate and treat the violent patient
155. Sullivan *et al.*[104]	Effects of patient-focused care on seclusion in a psychiatric intensive care unit
156. Sutton *et al.*[152]	Optimizing arousal to manage aggression: a pilot study of sensory modulation
157. Szypula and Martin[89]	*Balancing Risk & Safety When Reducing Restraint & Seclusion*
158. Taxis[227]	Ethics and praxis: alternative strategies to physical restraint and seclusion in a psychiatric setting
159. Taylor and Brown[94]	*Minimising Seclusion and Restraint: Sensory Approaches in the Adult Inpatient Psychiatric Setting*
160. Taylor-Watt *et al.*[153]	Reducing physical violence and developing a safety culture across wards in East London
161. Tees Esk and Wear Valleys NHS Foundation Trust[252]	*2017–18 Annual Report*

Author(s)	Title
162. Tees Esk and Wear Valleys NHS Foundation Trust[253]	*Positive Approaches Team 4 Day Course*
163. Trevarrow[82]	*Chill Out Room Project*
164. Tully *et al.*[90]	Innovation and pragmatism required to reduce seclusion practices
165. van De Sande *et al.*[200]	Aggression and seclusion on acute psychiatric wards: effect of short-term risk assessment
166. Visalli and Mcnasser[139]	Reducing seclusion and restraint: meeting the organizational challenge
167. Wale *et al.*[196]	Reducing the use of seclusion and restraint in psychiatric emergency and adult inpatient services – improving patient-centered care
168. West London NHS Trust[273]	*Positive and Safe: Violence Reduction and Management Programme – Instructors Manual*
169. Wieman *et al.*[211]	Multisite study of an evidence-based practice to reduce seclusion and restraint in psychiatric inpatient facilities

AQUA, Advancing Quality Alliance; BERT, Behavioural Escalation Response Team; DMHAS, Department of Mental Health and Addiction Services; Health PEI, Health Prince Edward Island; PROMISE, Proactive Management of Integrated Services and Environments; ST-ACS, St Anne's Community Service.

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