

Minimising the use of physical restraint in acute mental health services: The outcome of a restraint reduction programme ('REsTRAIN YOURSELF')



Joy Duxbury^{a,*}, John Baker^c, Soo Downe^b, Fiona Jones^b, Paul Greenwood^e, Helene Thygesen^b, Mick McKeown^b, Owen Price^d, Amy Scholes^d, Gill Thomson^b, Richard Whittington^{f,g}

^a Manchester Metropolitan University, United Kingdom

^b University of Central Lancashire, United Kingdom

^c Leeds University, United Kingdom

^d University of Manchester, United Kingdom

^e Advancing Quality Alliance (AQUA), United Kingdom

^f University of Liverpool, United Kingdom

^g Broset Centre for Research and Education in Forensic Psychiatry, Norway

ARTICLE INFO

Article history:

Received 18 July 2018

Received in revised form 17 March 2019

Accepted 21 March 2019

Keywords:

Physical restraint

Coercion

Mental health

Intervention study

ABSTRACT

Background: Physical restraint is a coercive intervention used to prevent individuals from harming themselves or others. However, serious adverse effects have been reported. Minimising the use of restraint requires a multimodal approach to target both organisational and individual factors. The 'Six Core Strategies' developed in America, underpinned by prevention and trauma informed principles, is one such approach.

Objective: An adapted version of the Six Core Strategies was developed and its impact upon physical restraint usage in mental health Trusts in the United Kingdom evaluated. This became known as 'REsTRAIN YOURSELF'. The hypothesis was that restraint would be reduced by 40% on the implementation wards over a six-month period.

Design: A non-randomised controlled trial design was employed.

Setting: Fourteen, adult, mental health wards from seven mental health hospitals in the North West of England took part in the study. Two acute care wards were targeted from all eligible acute wards within each site in negotiation with each Trust. The intervention wards (total n = 144 beds, mean = 20.1 beds per ward) and control wards (total n = 147 beds, mean = 21.0 beds per ward) were primarily mixed gender but included single sex wards also (2 female-only and 1 male-only in each group). All wards offered pharmacological and psychosocial interventions over short admission durations (circa 15 days) for patients with a mixture of enduring mental health problems.

Method: As part of a pre and post-test method, physical restraint figures were collected using prospective, routine hospital records before and 6 months after the intervention. Restraint rates on seven wards receiving the REsTRAIN YOURSELF intervention were compared with those on seven control wards over three study phases (baseline, implementation and adoption).

Results: In total, 1680 restraint incidents were logged over the study period. The restraint rate was significantly lower on the intervention wards in the adoption phase (6.62 events/1000 bed-days, 95% CI 5.53–7.72) compared to the baseline phase (9.38, 95% CI 8.19–10.55). Across all implementation wards there was an average reduction of restraint by 22%, with some wards showing a reduction of 60% and others less so (8%). The association between ward type and study phase was statistically significant.

Conclusion: In conclusion, it is possible that reductions in the use of physical restraint are achievable using a model such as the Six Core Strategies. This approach can be adapted for global settings and changes can be sustained over time with continued support.

© 2019 Elsevier Ltd. All rights reserved.

* Corresponding author.

E-mail address: J.Duxbury@mmu.ac.uk (J. Duxbury).

What is already known about the topic?

- Research has shown that coercive practices such as restraint are reportedly overused in health and social care settings
- It has been reported in a number of studies that restraint can cause psychological and physical trauma
- Few studies have been conducted internationally that report upon approaches to minimise the use of restrictive practices given the global scale of the problem

What this paper adds

- This is the first reported adaptation of an evidenced based American model to minimize the use of restraint in the United Kingdom
- There was a 22% reduction in the use of physical restraint when averaged over the seven wards during our project initiation period
- This research demonstrates that the Six Core Strategies can be adapted for international audiences and contexts to support the reduction of the use of coercive practices such as restraint using a trauma informed, organizational model.

1. Introduction

Physical restraint is a coercive intervention commonly used to prevent individuals in mental health services from harming themselves or others (National Institute of Clinical Excellence, 2015). Whilst policy and legislation specify that it should only be used as a 'last resort', it continues to be used routinely in mental health services in the UK and beyond (MIND, 2013; Agenda, 2017). A wide range of adverse effects have been reported as a result of the use of restraint ranging from patient and staff discomfort to injuries resulting in death (Duxbury et al., 2011; Mohr et al., 2003; Soininen et al., 2016). There is a growing recognition of the traumatic origins of mental distress and the potential for coercive practices to traumatise or retraumatise individuals (Sweeney et al., 2016; Bonner et al., 2002). Additionally when surveyed, many practitioners feel unrest with the use of restraint particularly when trying to balance patient safety with patients' rights and less invasive procedures (Duxbury and Whittington, 2005; Duxbury, 2015). There is a clear dissonance between wanting to maintain the safety of all in conflict situations whilst trying to ensure that patients are not retraumatized by approaches such as restraint and the resultant difficulties in maintaining a therapeutic relationship in such circumstances (Stewart et al., 2009; Cleary et al., 2012a). Staff have also reported injuries resulting in physical and psychological strain, stress, lack of confidence, prolonged sickness and dissonance (LeBel, 2011). The cost to the organisations when staff are injured, under threat or stressed as a result of threatening behaviour is significant and impacts upon staff turnover, burnout and litigation (LeBel and Goldstein, 2005; Sanders, 2009; LeBel et al., 2014).

Minimising the use of physical restraint and other coercive measures such as seclusion and chemical restraint and improving patient safety, means considering how the current system works and what changes are needed to reduce harm or injury to the service user (Bowers et al., 2015). Empirical evidence from Europe and North America clearly demonstrates that variations in restraint and seclusion rates are largely influenced by environmental, or contextual factors (Huckshorn, 2004a; Luciano et al., 2014; Riahi et al., 2016; Cowman et al., 2017) and that similar factors influence patients' subjective experiences of restrictive practices (Aguilera-Serrano et al., 2018). Unclear policies and

guidelines, overcrowding, poor ward design, low or inflexible staff numbers, inexperienced staff, poor staff retention, poor information sharing and service user acuity have all been implicated (Duxbury and Whittington, 2005; National Institute of Clinical Excellence, 2015). Various staff characteristics are also linked to aggression in mental health services, including negative interactional styles, provocative, authoritarian behaviour and poor communication skills (Bonner et al., 2002; Duxbury, 2002; Glover, 2005; Tunde Ayinmode and Little, 2004; Dack et al., 2012; Bowers, 2014). Hence, a substantial body of evidence indicates that many seclusion and restraint episodes may be preventable if these contextual factors are addressed (Sanders, 2009; Riahi et al., 2016).

2. Background

Events that threaten patient and staff safety such as violence, aggression and self-harm are not uncommon in mental health inpatient settings (Bowers et al., 2015). Staff responses to these incidents frequently involve the use of practices which contain or restrict an individual and can cause serious physical harm (Paterson et al., 2003) and adverse psychological effects (Bonner et al., 2002; Rose et al., 2015)

Restrictive interventions such as restraint are used globally (Cowman et al., 2017; Bowers et al., 2005, 2007; Steinert et al., 2010) They include a specific range of practices such as physical restraint, seclusion and rapid tranquilisation. They can however, be much wider reaching in the use of locked wards, rigid cultures, environmental restrictions and many other oppressive approaches commonly referred to as coercive practices (Duxbury and Whittington, 2005; Cowman et al., 2017). Rapid tranquilisation to treat and manage agitation and violence has also been recognized as a form of chemical restraint, which can be classed as a restrictive intervention (Department of Health, 2014).

Cultural differences however, mean that across countries and other European services some forms of restrictive practices are more acceptable than others. For example, mechanical restraint is a feature of American, Canadian, Australian and some European approaches in acute services (Guzman-Parra et al., 2016; Borckardt et al., 2011; Putkonen et al., 2013) but its use is rarely allowed in mainstream acute settings in the UK (National Collaborating Centre for Mental Health, 2015). Restrictive interventions can also have detrimental effects on therapeutic relationships between staff and patients (Stewart et al., 2009) some of which can be difficult to repair (Cleary et al., 2012b).

In the United Kingdom (UK), restrictive interventions began to attract significant attention following deaths that occurred during their use (Aiken et al., 2011) and particularly in light of a well reported scandal at a hospital which was exposed in 2011. The government response to this (Department of Health, 2012) resulted in the production of guidelines referred to as Positive and Proactive (Department of Health, 2014) promoting initiatives and values to minimise the use of restrictive interventions.

A number of restraint minimisation programmes have been developed over the past 15–20 years to address these issues with varying degrees of success. These include 'Safewards' originating in the UK (Bowers et al., 2015), and 'No Force First' (Ashcraft and Ashcraft, 2008) and the 'Engagement Model' (Borckardt et al., 2011) both originating in America. The 'Six Core Strategies' for minimising seclusion and restraint is a multilevel complex intervention targeting both organisational and individual factors in decision-making about care in acute mental health services (LeBel et al., 2014). The underpinning training curriculum to reduce and prevent the use of seclusion and restraint is a comprehensive approach for practice and culture change developed by the National Association of State Mental Health Program Directors (NASMHPD) and Huckshorn, (2004, 2006a, 2006b; Huckshorn and

LeBel, 2009; National Association of State Mental Health Program Directors (NASMHPD, 2011). The core strategies are leadership toward organisational change; the use of data to inform practice; workforce development; person-centered tools; service user roles within inpatient settings; and debriefing techniques. The implementation of programmes informed by the Six Core Strategies approach has been associated with reduced seclusion and restraint in a number of North American evaluations (Barton et al., 2009; LeBel, 2011; Lewis et al., 2009; Wieman et al., 2014; Riahi et al., 2016; Goulet et al., 2017). There is also evidence of broader improvements for service users and staff including greater satisfaction with care, reduced injuries, decreased medication use, shorter admission duration and reduced staff turnover and absenteeism (Barton et al., 2009; Paxton, 2009; LeBel, 2011; Sanders, 2009; National Institute of Clinical Excellence, 2015; Department of Health, 2014).

Beyond North America, the Six Core Strategies has been adapted for European mental health services where the treatment culture is likely to be different (Borckardt et al., 2011). Guzman-Parra et al (2016) for example, evaluated a multi-modal approach based upon the Six Core Strategies implemented on one acute mental health ward in Spain, with significant reductions in mean usage of mechanical restraint following the intervention. Putkonen et al. (2013) also evaluated a programme informed by the strategies using a cluster, Randomised Control Trial design in a high-security forensic setting and reported a significant reduction in coercion (seclusion, restraint or room observation) on the intervention wards.

The study reported in this paper also adapted the Six Core Strategies and evaluated the impact of its implementation at scale in UK acute mental services across seven mental health Trusts. The adaptation was based on extensive consultation with stakeholders

and became known as 'REsTRAIN YOURSELF'. The core strategies were operationalized through a number of specific interventions targeted for a UK context as follows: (1) setting team goals for the reduction of restraint; (2) reflecting upon the use of restraint and personal communication styles (through reporting and analysing every restraint incident over a period of time); (3) using approaches to help patients and staff ascertain needs and challenges with regards to aggression on the ward; (4) employing partnership working strategies to reduce restraint such as 'advance directives' (my safety plan), and positive verbal and non-verbal communication; (5) exploring environmental challenges to make appropriate changes (both physical and procedural); and (6) debriefing following incidents or near misses of restraint (Fig. 1).

The full implementation process and project evaluation, including secondary outcomes such as the perceived impact on the ward environment and therapeutic relationships, has been more fully, reported upon elsewhere (Duxbury et al, 2016, 2019). The aim of the phase of the study reported here however, was to examine changes in physical restraint use on participating wards following introduction of the intervention. The main hypothesis was that restraint use would be lower on intervention wards after the introduction of REsTRAIN YOURSELF.

3. Methods

3.1. Study design

The overarching evaluation consisted of a non-randomised controlled trial comprising a mixture of qualitative and quantitative approaches including the measurement of physical restraint rates, the outcome of staff and patient surveys and interviews and

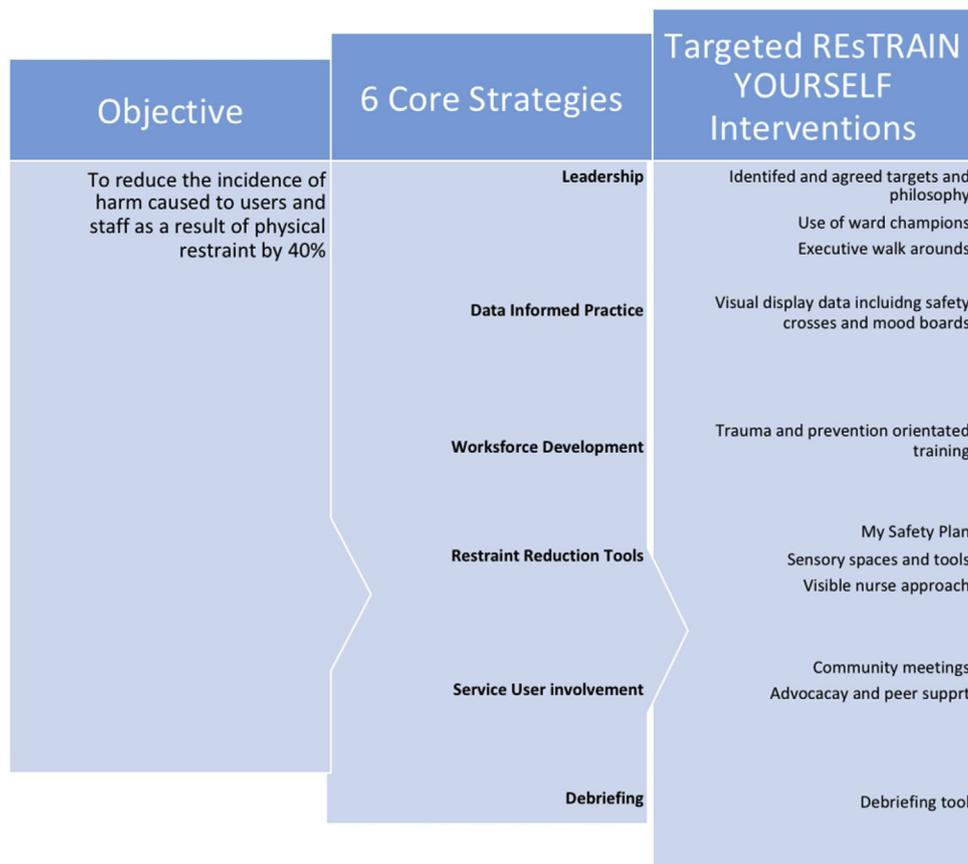


Fig. 1. REsTRAIN YOURSELF interventions aligned to each of the Six Core Strategies.

ethnographic data. For the purpose of this paper only the restraint data outcomes are reported upon here. Restraint rates on acute mental health care wards receiving the intervention were compared with those on control wards over 3 study phases (baseline, implementation and adoption). This design is commonly used in studies involving complex interventions in health services, which are described as interventions that contain several interacting components (Craig et al., 2008). Other characteristics that evaluators should take into account include a good theoretical understanding of what is needed and how the intervention causes change; The exploration of any lack of effect which may reflect implementation failure (or teething problems) rather than genuine ineffectiveness. A thorough process evaluation to identify implementation problems; The consideration of a range of measures so that any unintended consequences are picked up where possible; And finally, information outlining the adaptation of the intervention to local settings.

Whilst many issues surrounding evaluation of complex interventions are still debated, guidelines are there to help researchers, funders, and other decision makers to make appropriate methodological and practical choices (Craig et al., 2008).

Fidelity in studies of this sort is also an important issue, however it is not straightforward in relation to complex interventions (Hawe et al., 2004). Whilst in some evaluations, such as those seeking to identify active ingredients within a complex intervention, strict standardisation may be required and controls put in place to limit variation in implementation (Farmer et al., 2007), others are designed to be adapted to local circumstances. In this study, the six core strategies were applied as part of the implementation of REsTRAIN YOURSELF, however, some local nuances were catered for dependent upon local need. For example, targeted training in the prevention and management of self-harm and for those with specific disorders such as personality disorders, was provided to some wards where this was identified as a significant contributory factor to the development of conflict. The key is to be clear about how much change or adaptation is permissible and to record variations in implementation so that fidelity can be assessed in relation to the degree of standardisation required by the study protocol.

3.2. Setting and participants

The study took place on 14 acute, adult wards across various sites in the North West of England comprising five counties; Cheshire, Greater Manchester, Merseyside, Lancashire and Cumbria with over 7 million residents. In 2012, the region's physical restraint rates were reported to be high when compared to the

average for England at that time (MIND, 2013). For example the seven Trusts averaged 1221 restraint episodes in 2012 compared with a national average of 455. The average number of patients restrained, use of 'face down' restraint, restraint-related injuries and restraint-related complaints in these Trusts were all significantly greater than the national average (MIND, 2013). The number of patients restrained was 7073 (mean 884, range 62–1965, national average 247). The four Trusts that reported face down data recorded 271 face down restraints (mean 68, range 02–175, national average 65), whilst all the Trusts that provided restraint-related injury data recorded 552 restraint related injuries (mean 79, range 0–200, national average 7). There were zero restraint related deaths and 26 restraint-related complaints across all seven Trusts (mean 3, range 0–8, national average 2).

Two acute care wards were targeted from all eligible acute wards within each participating organization in negotiation with each Trust. The research team then endeavoured to allocate matched wards for each Trust taking into account restraint use, number of beds and patient demographics. This information was then fed back to the Trust leads for the project. Whilst allocations were then made and matched, some Trusts communicated that they were limited in the wards they could use due to competing interventions that had been introduced in some areas. Therefore, agreements between the research team and the Trusts had to be reached meaning that in some instances, non-matched samples had to be used. Whilst the research team initially endeavoured to use matched criteria e.g. restraint rates, acuity, gender mix, when selecting a comparison ward in the same Trust, this process was hampered by factors external to the study. For example, the simultaneous implementation of other conflict minimisation interventions, led to the exclusion of what might have been well-matched wards resulting in a reduced pool of wards from which to select participants. Therefore, there were some differences between ward pairs at baseline. The intervention wards (total n = 144 beds, mean = 20.1 beds per ward) and control wards (total n = 147 beds, mean = 21.0 beds per ward) were primarily mixed gender but included single sex wards also (2 female-only and 1 male-only in each group). All wards offered a combination of pharmacological and psychosocial interventions over relatively short admission durations (circa 15 days) (Table 1).

3.3. Intervention

Over the period of the project, and within all the participating Trusts, a range of different innovations were rolled out on the implementation wards within a six core strategy framework.

Table 1

Description of innovations implemented as part of REsTRAIN YOURSELF (See toolkit for more information).

Innovation	Description
My Safety Plan	A self management tool for patients that helps to identify triggers, Early Warning Signs and calming strategies to better manage and avoid violent incidents.
Mood board in community meetings	At the start of any ward based community meeting a discussion on the mood of the ward using weather symbols (stormy,cloudy,sunny) to depict the mood in the past 24/36 hrs.
Protected time	Staff are given permission to eat either their own food or hospital food with the patients at mealtimes.
Therapeutic activities	A range of activities are developed that engage patients throughout the day, evenings and weekends.
Least restrictive care planning	Within formulation meetings the team collate data from My Safety Plans, restraint/violent incidents and develop a plan aimed at reducing violent incidents.
15 Step Challenge	A process of identifying possible improvements that could be made on a ward by assessing the feel of the following areas: welcome, safe, caring and involving and well-organised and calm.
Clinical supervision	Supervision incorporates issue of trauma on both patients and staff and seeks solutions to reduce it.
De-escalation training	Training that focused on techniques to prevent and reduce violence.
Sensory/Comfort/low stimulus rooms	These are spaces and tools that enable patients who are distressed to seek a safe space to help calm them.
Safety crosses	These are a visual aid shaped in a cross with 31 boxes covering a month. Staff put a cross in the box of the date the restraint or violent incident happened. This is in the office for all staff to see and reflect upon at regular meetings.
Visible Nurse	One Qualified Nurse each shift spends a minimum of 30% of their time out in patient areas.

As part of our team, a dedicated improvement adviser worked on the wards one day a week to support the implementation of the approach using a number of strategies including:

- The identification of potential change ideas with staff in line with REsTRAIN Yourself.
- The exploration of Ideas and changes that the individual teams would test using Plan, Do, See, Act cycles within their selected ward.
- The identification of group and individual roles and ownership whereby each member of the team commits to individual actions in order to achieve agreed goals.

To prepare the participating ward teams a 'Train the Trainer' model was used to roll out training. An online toolkit, which incorporates theory, Quality Improvement methodological techniques, case examples and top tips, was developed to support both the 2 day face to face training events and ongoing implementation of the approach. (<https://www.aquanw.nhs.uk/resources/restrain-yourself-toolkit/20917>). Local steering groups were set up to progress ongoing spread and sustainability. The approach focused on identified champions for each ward and attendance at action learning sessions on a monthly basis.

When using a complex intervention of this type, without a complete published description of interventions, clinicians and patients cannot reliably implement approaches that are shown to be useful, and other researchers cannot replicate or build on research findings. To assist with future work in this area and to aid implementation and replication, the Template for Intervention Description and Replication (TIDieR) checklist and guide is attached as an appendix to this paper. This may improve the reporting of using the REsTRAIN YOURSELF intervention and make it easier to use the information (Hoffman et al., 2014).

3.4. Procedure

There were three study phases during the course of the project. These were baseline, implementation and adoption. The implementation phase covered the period when the REsTRAIN YOURSELF adviser was active on the ward (duration mean per ward = 5 months, range = 3.5–5.5 months). The baseline phase (mean duration = 13.6 months, range = 8.1–18.3 months) covered the study period prior to this implementation activity and the adoption phase (mean duration = 7.9 months, range = 2.4–13.1 months) covered the period after the Improvement Advisor stopped visiting the ward. In this phase, staff were encouraged to carry on REsTRAIN YOURSELF implementation without active external support from the project and the continued use of their local 'champions'. The baseline and adoption phases covered at least 6 months each. In order to allocate the wards to a study group, a project lead from each Trust produced a table of all their inpatient wards including their characteristics and any similar initiatives that were being introduced on each ward such as 'Safewards'.

During the baseline phase care was delivered following standard protocols in force at the participating trust at the time. The variation in baseline duration occurred because data were available from all trusts at the start of the study but the intervention was implemented in waves at three different time points. Therefore early implementers had a shorter baseline than later implementers. Restraint rates were monitored throughout the baseline period and not at a single time point. The duration of the final adoption phase varied between wards. Whilst this has been controlled for statistically, it is not possible to estimate how long any changes persisted across periods within the adoption phase or indeed beyond. The total study duration was 16.7 months

on all wards. Wards varied only in terms of what proportion of this overall time period involved each study phase as outlined.

3.5. Analysis

The primary outcome of interest was the number of physical restraint events logged on the organization's adverse incidents recording system during the study period (January 2015–February 2016). Physical restraint was defined at the time of the study as "a skilled hands-on method involving trained, designated healthcare professionals" designed to safely immobilise an individual to prevent them from harming themselves, endangering others or seriously compromising the therapeutic environment (National Institute of Clinical Excellence, 2015). It can be implemented with the service user on the floor or in a standing or seated position. Anonymised prospective case-level data from incident records was provided for every episode of physical restraint occurring on the intervention and comparator wards during the specified period.

Restraint event rates per 1000 bed-days with 95% confidence intervals were calculated for the intervention and comparator wards across the study period. Associations between exposure to the intervention and restraint frequencies were tested using chi-squared analysis. Data analyses were conducted at the cluster level only and no individual level data analyses were performed.

3.6. Ethics

The study was approved by the National Research Ethics Service of the Health Research Authority for England (ref. 14/YH/0164) in July 2014. Consent for access to anonymised secondary data was not required by the research ethics committee and was not obtained.

4. Results

4.1. Restraint rates

In total, 1680 physical restraint incidents were logged over the full study period (range across organisations = 68–492 incidents). This equates to 0.15 restraints per day or approximately 1 restraint every 6.5 days. Overall, there was an average reduction of physical restraint rates across the intervention wards of 22%. More restraint took place overall on REsTRAIN YOURSELF intervention wards ($n = 980$, 58.3% of all restraint incidents) than comparator wards ($n = 700$, 41.6%). The restraint rate was significantly lower on the intervention wards in the adoption phase (6.62 events/1000 bed-days, 95% CI 5.53–7.72) compared to the baseline phase (9.38, 95% CI 8.19–10.55) (see Fig. 2). However there was a substantial temporary increase on the intervention wards during the implementation phase (10.76, 95% CI 9.34–12.19) prior to the decrease in the adoption phase. Also there were substantial variations in trends across the intervention wards with decreases exceeding 18% on five wards and increases exceeding 20% on two wards (see Table 2). There were no significant changes in restraint rates on the comparator wards over the same period (baseline: 5.33, 95% CI 4.45–6.20; implementation: 5.65, 95% CI 4.62–6.67; adoption: 7.22, 95% CI 6.01–8.42). The intervention wards had significantly higher restraint rates at baseline than the comparator wards but the rates were comparable in the final adoption phase of the study.

The association between ward type (comparator versus implementation) and study phase was statistically significant for this analysis (chi-squared = 39.15, $df = 13$ $p < .0002$; effect size = 62% reduction relative to comparator wards).

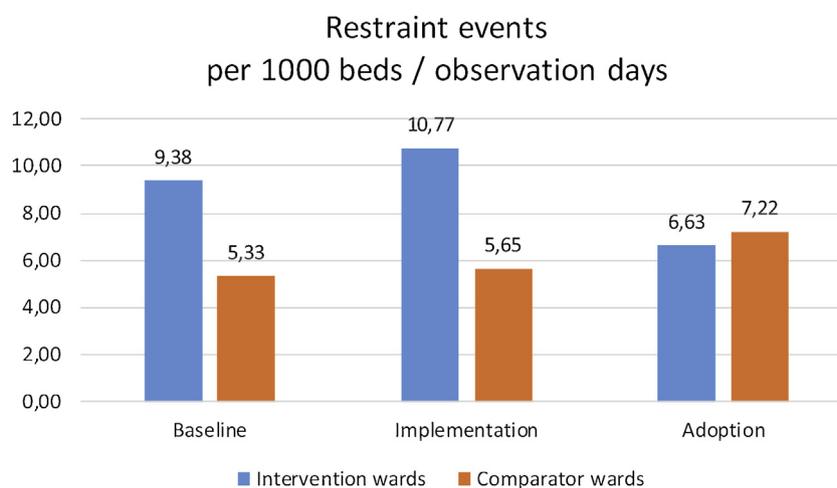


Fig. 2. restraint rates (and 95% CI) per 1000 beds/observation days.

Table 2

Restraint episodes per 1000 bed days from baseline to adoption phase on RESTRRAIN YOURSELF implementation wards.

Ward	Baseline phase	Adoption phase	% change
A	17.22	11.11	–35.48
B	5.56	2.50	–55.00
C	3.70	3.01	–18.75
D	6.30	2.22	–64.71
E	8.33	10.10	+21.21
F	6.04	12.08	+100.00
G	19.44	9.03	–53.57

5. Discussion

This large-scale study sought to evaluate the implementation of a restraint minimisation programme underpinned by principles of prevention and trauma informed care, in a number of UK acute mental health settings. However, only the impact on physical restraint is reported upon in this paper. There is preliminary evidence here of some potential association between the implementation of RESTRRAIN YOURSELF and reduced use of restraint not dissimilar to that reported in other studies where complex multidimensional approaches based upon the Six Core Strategies have been used (Riahi et al., 2016; Putkonen et al., 2013; Hernandez et al., 2017). Caution is required however, when assessing the level of association between implementation and outcomes given the limitations reported. Notable concerns include a lack of randomisation or standardized implementation, the use of nonmatched wards and limited feasibility work.

With regard to restraint rates, the most stringent test involves comparing the adoption phase when staff were expected to sustain the changes in practice without active support from the adviser, with the baseline levels prior to implementation. The use of restraint was significantly lower in this latter phase on wards where the Intervention took place. This was achieved in the context of increased use of restraint in comparable settings over the same period. This suggests that the intervention could have been successfully embedded into the participating ward cultures, potentially having some effect on reducing staff reliance on coercive measures. Riahi et al (2016) reported similar results in reducing seclusion and mechanical restraint when approaches such as the Six Core Strategies promote enhanced staff knowledge, skills and attitudes that results in organisational changes to cultures. This is also true in the reduction of conflict and containment as evidenced in the use of Safewards (Bowers

et al., 2015). Hernandez et al (2017) found a step decrease in seclusion hours and restraint over time using an interrupted time series analysis pre and post implementation of a multidimensional approach to restraint minimization based upon the Six Core Strategies. They concluded that leadership and daily rounds were particularly valuable in reducing average restraint and seclusion hours.

The significant reduction in restraint rates between the two phases is in line with that reported by Putkonen et al. (2013) in their Randomised Control Trial in a high secure forensic setting in Finland. They found a scale of reduction (29% in rates per 100 beds/observation days) to be substantial exceeding that reported by Blair et al. (2017) and Lewis et al. (2009) in their respective studies. Statistically significant associations were also found between the intervention and a decrease in both the number of seclusions ($p < 0.01$) and the duration of seclusion per admission ($p < 0.001$). These preliminary results support the conclusion that this intervention was effective in reducing the use of seclusion.

In our project the non-randomised nature of the design inevitably limits the degree to which this effect can be attributed to the RESTRRAIN YOURSELF programme alone. Whilst the initial intention was to match wards on a number of variables, operational factors such as the limited pool of available wards ultimately made this difficult to achieve. In particular, restraint rates were higher on the implementation wards than the comparator wards at baseline. This may suggest some underlying differences between the wards in each group, which limit the direct conclusions that can be drawn about any causal effect of the intervention. It should also be noted that the base rates of restraint were low on some of these wards and the trend varied both within and between wards. This indicates some caution in making any interpretations of the relationship between the intervention and restraint rates.

The non-significant increase during the implementation phase is also noteworthy indicating either challenges in adjusting to the new approach or a reduced threshold amongst staff for the reporting of incidents due to the highlighting of the issue through participation in the study. Improved reporting systems as part of the intervention strategy may also have increased sensitization to recording events during the early phases. Bowers et al (2015) found a similar rise initially when implementing Safewards.

The variation between wards is also worth noting. The combined trend across all the wards for a reduction in restraint masks different patterns on individual wards. Whilst all but one of the wards were similar in that they reported a decrease following

implementation, these reductions varied from 65% to 8%. Given the complexity of the intervention and the context, there are numerous potential factors, which may have influenced the degree of reduction including reporting differences and programme fidelity but unfortunately, it is not possible to examine these factors in the current design. Future research testing this intervention could include additional measures to consider these potential factors and greater feasibility work. It is of concern also that one ward reported an increase in restraint after implementation of the programme. Again, it is not possible to test any speculation about possible causes for this counter-intuitive trend but it may reflect improved reporting as one element of the intervention and/or difficulties we encountered engaging with this ward team in comparison to others.

From the evaluation data reported more fully elsewhere (Duxbury et al., 2016), we were able to identify that arguably, across all of the wards in the study, both before and after the implementation of REsTRAIN YOURSELF, embedded cultures and practices shared a number of common characteristics. This was so despite a complex mix of different environments, staff and service user views and behaviour. All of this took place against a backdrop of constraining structural and resource issues, including managerial reorganisations and service relocations in some of the Trusts. Further qualitative findings reporting upon the impact of processes aligned to this project can be found in Duxbury et al. (2019). Challenges and positive effects are outlined from a nursing perspective many of which are not unique to mental health settings (Bevan and Fairman, 2014; Grol et al., 2013; Robert et al., 2015), other mental health care change initiatives (Brennan et al., 2006; Woltmann et al., 2008; Chambers et al., 1998; McAndrew et al., 2014) or conflict minimisation projects (Bowers et al., 2006; Riahi et al., 2016).

Despite our success in reducing the use of restraint over the study period, the pull to coercion is powerful and subject to social forces beyond the influence of individual nurses and teams; being framed by a significant governance attachment to risk management within a wider frame of a 'risk society'. Staff have to gain faith in the instrumental value of alternative approaches to volatile and distressed individuals such as REsTRAIN YOURSELF, or in the context of self-harm. Pettit et al (2016) reported that where there is no access to seclusion, staff as a team are slower to initiate restraint, suggesting an achievable positive service shift. Staff have to believe however, that changing practices which are managerially supported are indeed, legitimated. Despite some counter-veiling forces such as staff sickness and resistance, the intervention may have made some progressive inroads into reducing instances of restraint and altering various ward practices. Staff were very positive about the approach overall and found the results to be both convincing and reassuring (Duxbury et al., 2019).

6. Limitations

Whilst this study has shown promising results, a number of limitations are evident as highlighted in the discussion section. Firstly, despite our initial best efforts, the wards were not sufficiently matched due to pressures on the wards and endeavours to avoid contamination and competing initiatives. Secondly, a number of confounding variables could have influenced the reduction of the restraint figures and not solely the complex intervention in its entirety. For example, we were unable to report upon a number of issues which may have been influential including the number of patients treated in the respective periods of time, outcomes other than number of restraint episodes per time and bed or on the frequency of violent incidents over the respective periods.

The outcome examined here, restraint events, is a robust measure but inevitably restraint events may be influenced by other contextual factors such as admission rates and general level of violence. The unavailability of data on these other factors due to project resource constraints prevented us from conducting a more complex analysis which may have identified additional interacting variables in a broader restraint prediction model. Future research in this area should aim to capture this wider picture.

Finally, whilst we know that the intervention has continued in a number of Trusts anecdotally and that teams report its continued success, we do not have any data that looked at the fidelity or the sustainability of the intervention. That said the implementation toolkit is freely available online and breaks down all the stages of the REsTRAIN YOURSELF approach so that the process can be replicated (<https://www.aquanw.nhs.uk/resources/restrain-yourself-toolkit/20917>).

7. Conclusion

Acknowledging the limitations of a non-randomised evaluation and the non standardisation of some aspects of the implementation process outlined above, we were able to report an average reduction of restraint by 22% on the implementation wards over a six-month period. Some wards recorded significantly greater figures than this. However, whether this can be solely attributed to REsTRAIN YOURSELF is yet to be established. Our findings did demonstrate that reductions in the use of restraint and changes to the psychosocial ward environment are potentially achievable with the support of multidimensional organisational models (Hernandez et al., 2017; Putkonen et al., 2013; Goulet et al., 2017). Interventions such as REsTRAIN YOURSELF, which enable teams to take collective ownership of changes in their own ward environments, and to build positive engagement with service users through data informed practice and person-centred tools, are an important step in the right direction. This promotes the recognition of service users' existing trauma, as opposed to relying upon readily available coercive measures (Hernandez et al., 2017; Blair et al., 2017). With additional investment in overall resources and managerial support to minimise the use of practices such as restraint, as advocated by Huckshorn (2004) and as seen in the work of Riahi et al (2016), even better outcomes might be possible. The use of feasibility studies to explore and evidence usable and acceptable approaches to implement the Six Core Strategies in different geographical and practice settings in the future would be welcomed.

Relevance for clinical practice

Organisational models based upon approaches such as the six core strategies are increasingly proving to be popular in reducing restrictive interventions such as physical restraint. Given the current trend to minimize restrictive interventions globally and the underpinning political and policy agendas, this is an opportunity for teams to use evidence based, multimodal preventative, trauma informed and person-centered tools, to both reduce conflict on inpatient wards but also to minimise practices which are increasingly seen to be physically and psychologically traumatising to service users and staff.

Acknowledgement

This study was funded by the Health Foundation as part of the 'Closing the Gap' funding stream 2014–2016.

Thank you to all the wards and participants who took part and gave their time so freely.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ijnurstu.2019.03.016>.

References

- Agenda, 2017. A Briefing Document on the Use of Restraint Against Women and Girls March 2017. Agenda, London.
- Aguilera-Serrano, C., Guzman-Parra, J., Garcia-Sanchez, J.A., Moreno-Küstner, B., Mayoral-Cleries, F., 2018. Variables associated with the subjective experience of coercive measures in psychiatric inpatients: a systematic review. *Can. J. Psychiatry* 63 (2), 129–144.
- Aiken, F., Duxbury, J., Dale, C., Harbison, I., 2011. Report on the Theories on Restraint Related Deaths in the UK. Ministry of Justice, London.
- Ashcraft, L., Anthony, W.A., Jaccard, S., 2008. Rein in seclusion and restraints: they are not compatible with recovery-oriented services. *Behav. Healthc.* 1 (12), 6–8 28.
- Barton, S.A., Johnson, M.R., Price, L.V., 2009. Achieving restraint-free on an inpatient behavioral health unit. *J. Psychosoc. Nurs. Mental Health Serv.* (1), 34–40.
- Bevan, H., Fairman, S., 2014. The new era of thinking and practice in change transformation: A Call to Action for Leaders of Health and Care. NHSIQ (NHS Improving Quality). <http://media.nhs.uk/whitepaper/html5/index.html?page=1>.
- Blair, E.W., Woolley, S., Szarek, B.L., et al., 2017. Reduction of seclusion and restraint in an inpatient psychiatric setting: a pilot study. *Psychiatr. Q.* 88 (Mar (1)), 1–7 2017.
- Bonner, G., Lowe, T., Rawcliffe, D., Wellman, N., 2002. Trauma for all: a pilot study of the subjective experience of physical restraint for mental health inpatients and staff in the UK. *J. Psychiatr. Ment. Health Nurs.* 1;9 (4), 465–473.
- Borckardt, J.J., Madan, A., Grubaugh, A.L., Danielson, C.K., Pelic, C.G., Hardesty, S.J., Hanson, R., Herbert, J., Cooney, H., Benson, A., Frueh, B.C., 2011. Systematic investigation of initiatives to reduce seclusion and restraint in a state psychiatric hospital. *Psychiatr. Serv.* 62 (5), 477–483.
- Bowers, L., 2014. Safewards: a new model of conflict and containment on psychiatric wards. *J. Psychiatr. Ment. Health Nurs.* 21, 499–508.
- Bowers, L., Douzenis, A., Galeazzi, G., Forghieri, M., Tsopelas, C., Simpson, A., Allan, T., 2005. Disruptive and dangerous behaviour by patients on acute psychiatric wards in three European centres. *Soc. Psychiatry Psychiatr. Epidemiol.* 40 (10), 822–828.
- Bowers, L., Nijman, H., Allan, T., Simpson, A., Warren, J., Turner, L., 2006. Prevention and management of aggression training and violent incidents on UK acute psychiatric wards. *Psychiatr. Serv.* 57 (7), 1022–1026.
- Bowers, L., van der Werf, B., Vokkolainen, A., Muir, Cochrane, E., Allan, T., Alexander, J., 2007. International variation in containment measures for disturbed psychiatric inpatients: a comparative questionnaire survey. *Int. J. Nurs. Stud.* 44, 357–364.
- Bowers, L., James, K., Quirk, A., Simpson, A., Stewart, D., Hodsoll, J., 2015. Reducing conflict and containment rates on acute psychiatric wards: the safewards cluster randomised controlled trial. *Int. J. Nurs. Stud.* 52 (9), 1412–1422 2015.
- Brennan, G., Flood, C., Bowers, L., 2006. Constraints and blocks to change and improvement on acute psychiatric wards—lessons from the City Nurses project. *J. Psychiatr. Ment. Health Nurs.* 13 (5), 475–482.
- Chambers, M., 1998. Interpersonal mental health nursing: research issues and challenges. *J. Psychiatr. Ment. Health Nurs.* 5, 203–211.
- Cleary, M., Horsfall, J., O'Hara-Aarons, M., Jackson, D., Hunt, G.E., 2012a. Mental health nurses' perceptions of good work in an acute setting. *Int. J. Ment. Health Nurs.* 21 (5), 471–479.
- Cleary, M., Hunt, G.E., Horsfall, J., Deacon, M., 2012b. Nurse-patient interaction in acute adult inpatient mental health units: a review and synthesis of qualitative studies. *Issues Ment. Health Nurs.* 33 (2), 66–79.
- Cowman, S., Björkdahl, A., Clarke, E., Gethin, G., Maguire, J., 2017. A descriptive survey study of violence management and priorities among psychiatric staff in mental health services, across seventeen European countries. *BMC Health Serv. Res.* 17 (1), 59.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., Petticrew, M., 2008. Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ* 337 (Sep 29), a1655. doi:<http://dx.doi.org/10.1136/bmj.a1655>.
- Dack, C., Ross, J., Bowers, L., 2012. The relationship between attitudes towards different containment measures and their usage in a national sample of psychiatric inpatients. *J. Psychiatr. Ment. Health Nurs.* 19 (7), 577–586.
- Department of Health, 2012. Transforming Care: a National Response to Winterbourne View Hospital Department of Health Review: Final Report. Department of Health.
- Department of Health, 2014. Positive and Proactive Care: Reducing the Need for Restrictive Interventions. Department of Health.
- Duxbury, J., 2002. An evaluation of staff and patient views of and strategies employed to manage inpatient aggression and violence on one mental health unit: a pluralistic design. *J. Psychiatr. Ment. Health Nurs.* 9, 325–337.
- Duxbury, J.A., 2015. Editorial: minimizing the use of coercive practices in mental health: the perfect storm. *J. Psychiatr. Ment. Health Nurs.* 22, 89–91.
- Duxbury, J., 2016. Implementing the Six Core Strategies (RESTRRAIN YOURSELF): Working in Partnership to Minimise Harm to Patients and Staff by Reducing the Use of Physical Restraint. Health Foundation Report, London.
- Duxbury, J., Whittington, R., 2005. Causes and management of patient aggression and violence: staff and patient perspective. *J. Adv. Nurs.* 50, 469–478.
- Duxbury, J., Aiken, F., Dale, C., 2011. Deaths in custody: the role of restraint. *J. Learn. Disabil. Offending Behav.* 2 (4), 178–189.
- Duxbury, J., Thomson, G., Scholes, A., Jones, F., Baker, J., Downe, S., Greenwood, P., Price, O., Whittington, R., McKeown, M., 2019. Staff experiences and understandings of the RESTRRAIN Yourself initiative to minimize the use of physical restraint on mental health wards. *Int. J. Ment. Health Nurs.* doi:<http://dx.doi.org/10.1111/inm.12577>.
- Farmer, A., Wade, A., Goyder, E., Yudkin, P., French, D., Craven, A., et al., 2007. Impact of self-monitoring of blood glucose in the management of patients with non-insulin treated diabetes: open parallel group randomised trial. *BMJ* 335, 132–139.
- Glover, R.W., 2005. Special section on seclusion and restraint: commentary reducing the use of seclusion and restraint: a NASMHPD priority. *Psychiatr. Serv.* 56 (9), 1141–1142.
- Goulet, M.H., Larue, C., Dumais, A., 2017. Evaluation of seclusion and restraint reduction programs in mental health: a systematic review. *Aggress. Violent Behav.* 34, 139–146.
- Grol, R., Wensing, M., Eccles, M., Davis, D. (Eds.), 2013. Improving Patient Care: the Implementation of Change in Health Care. John Wiley & Sons, Oxford.
- Guzman-Parra, J., Aguilera Serrano, C., Garcia-Sánchez, J.A., Pino-Benitez, I., Alba-Vallejo, M., Moreno-Küstner, B., Mayoral-Cleries, F., 2016. Effectiveness of a multimodal intervention program for restraint prevention in an acute Spanish psychiatric ward. *J. Am. Psychiatr. Nurses Assoc.* 22 (3), 233–241.
- Hawe, P., Shiell, A., Riley, T., 2004. Complex interventions: how “out of control” can a randomised trial be? *BMJ* 328, 1561–1563.
- Hernandez, A., Riahi, S., Stuckey, M.I., et al., 2017. Multidimensional approach to restraint minimization: the journey of a specialized mental health organization. *International Journal of Mental Health Nursing* 26 (5), 482–490.
- Hoffman, T.C., Glasziou, P.P., Boutron, I., et al., 2014. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 348, 1–12. doi:<http://dx.doi.org/10.1136/bmj.g1687>
- Huckshorn, K., 2004a. Reducing seclusion restraint in mental health use settings: core strategies for prevention. *J. Psychosoc. Nurs. Ment. Health Serv.* 42, 22–33.
- Huckshorn, K.A., 2004b. Reducing the use of seclusion and restraint in mental health systems: a public health prevention approach with interventions. *J. Psychosoc. Nurs. Ment. Health Serv.* 42 (9), 22–33.
- Huckshorn, K., 2006a. Re-designing state mental health policy to prevent the use of seclusion and restraint. *Adm. Policy Ment. Health Ment. Health Serv. Res.* 33, 482–491.
- Huckshorn, K.A., 2006b. Re-designing state mental health policy to prevent the use of seclusion and restraint. *Adm. Policy Ment. Health* 33 (4), 482–491.
- Huckshorn, K.A., LeBel, J.L., 2009. Improving Safety in Mental Health Treatment Settings: Preventing Conflict, Violence and the Use of Seclusion and Restraint. SS Sharfstein, FB. .
- Lebel, J., Duxbury, J., Putkonen, A., et al., 2014. Multinational experiences in reducing and preventing the use of restraint and seclusion. *J. Psychosoc. Nurs. Ment. Health Serv.* 52 (11), 22–29.
- LeBel, J., 2011. The Business Case for Preventing and Reducing Restraint and Seclusion Use. HHS Publication No. (SMA) 11-4632. Center for Mental Health Services, Substance Abuse and Mental Health Services Administration., Rockville, MD.
- LeBel, J., Goldstein, R., 2005. The economic cost of using restraint and the value added by restraint reduction or elimination. *Psychiatr. Serv.* 56 (9), 1109–1114.
- Lewis, M., Taylor, K., Parks, J., 2009. Crisis prevention management: a program to reduce the use of seclusion and restraint in an inpatient mental health setting. *Issues Ment. Health Nurs.* 30 (3), 159–164.
- Luciano, M., Sampogna, G., Del Vecchio, V., Pingani, L., Palumbo, C., De Rosa, C., Catapano, F., Fiorillo, A., 2014. Use of coercive measures in mental health practice and its impact on outcome: a critical review. *Expert Rev. Neurother.* 14 (2), 131–141.
- McAndrew, S., Chambers, M., Nolan, F., Thomas, B., Watts, P., 2014. Measuring the evidence: reviewing the literature of the measurement of therapeutic engagement in acute mental health inpatient wards. *Int. J. Ment. Health Nurs.* 23 (3), 212–220.
- MIND, 2013. Mental Health Crisis Care: Physical Restraint in Crisis: a Report on Physical Restraint in Hospital Settings in England. MIND, London.
- Mohr, W.K., Petti, T.A., Mohr, B.D., 2003. Adverse effects associated with physical restraint. *Can. J. Psychiatry* 48 (5), 330–337.
- National Association of State Mental Health Program Directors (NASMHPD), 2011. National Executive Training Institute: a Training Curriculum for the Reduction of Seclusion and Restraint, 9th edition National Association of State Mental Health Program Directors, Office of Technical Assistance, Alexandria, VA.
- National Collaborating Centre for Mental Health, 2015. Violence and Aggression Short-term Management in Mental Health, Health and Community Settings Updated Edition NICE Guideline NG10. .
- Paterson, B., Bradley, P., Stark, C., Saddler, D., Leadbetter, D., Allen, D., 2003. Deaths associated with restraint use in health and social care in the UK. The results of a preliminary survey. *Psychiatr. Ment. Health Nurs.* 10 (1), 3–15.
- Paxton, D., 2009. The Village Network's experience creating and supporting coercionfree and violence-free treatment environments. Paper presented at the Ohio Department of Mental Health and the Ohio Association of Child Caring Agencies conference. Proactive Positive Interventions, Columbus, OH.

- Pettit, S.A., Bowers, L., Tulloch, A., Alexis, E., et al., 2016. Acceptability and use of coercive methods across differing service configurations with and without seclusion and/or psychiatric intensive care units. *J. Adv. Nurs.* 73 (4), 966–976.
- Putkonen, A., Kuivalainen, S., Louheranta, O., Repo-Tiihonen, E., Ryyänen, O.-P., Kautiainen, H., et al., 2013. Cluster-randomized controlled trial of reducing seclusion and restraint in secured care of men with schizophrenia. *Psychiatr. Serv.* 64 (9), 850–855.
- Riahi, S., Thomson, G., Duxbury, J., 2016. An integrative review exploring decision-making factors influencing mental health nurses in the use of restraint. *J. Psychiatr. Ment. Health Nurs.* 23 (2), 116–128.
- Robert, G., Cornwell, J., Locock, L., Purushotham, A., Sturmey, G., Gager, M., 2015. Patients and staff as codesigners of healthcare services. *BMJ* 350, 7714.
- Rose, D., Evans, J., Laker, C., Wykes, T., 2015. Life in acute mental health settings: experiences and perceptions of service users and nurses. *Epidemiol. Psychiatr. Sci.* 24, 90–96.
- Sanders, K., 2009. The effects of an action plan, staff training, management support and Monitoring on restraint use and costs of work-related injuries. *J. Appl. Res. Intellect. Disabil.* 22 (2), 216–220.
- Soininen, P., Kontio, R., Joffe, G., Putkonen, H., 2016. Patient experience of coercive measures. *The Use of Coercive Measures in Forensic Psychiatric Care*. Springer, Cham, pp. 255–270.
- Steinert, T., Lepping, P., Bernhardsgrütter, R., Conca, A., Hatling, T., Janssen, W., et al., 2010. Incidence of seclusion and restraint in psychiatric hospitals: a literature review and survey of international trends. *Soc. Psychiatry Psychiatr. Epidemiol.* 45 (9), 889–897.
- Stewart, D., Bowers, L., Simpson, A., Ryan, C., Tziggili, M., 2009. Manual restraint of adult psychiatric inpatients: a literature review. *J. Psychiatr. Ment. Health Nurs.* 16 (8), 749–757.
- Sweeney, A., Clement, S., Filson, B., Kennedy, A., 2016. Trauma-informed mental healthcare in the UK: what is it and how can we further its development? *Ment. Health Rev. J.* 21 (3), 174–192.
- Tunde Ayinmode, M., Little, J., 2004. Use of Seclusion in a psychiatric acute inpatient unit. *Australas. Psychiatry* 12 (4), 347–351.
- Wieman, D.A., Camacho-Gonsalves, T., Huckshorn, K., Leff, S., 2014. Multisite study of an evidence-based practice to reduce seclusion and restraint in psychiatric inpatient facilities. *Psychiatr. Serv.* 65 (3) .
- Woltmann, E.M., Whitley, R., McHugo, G.J., Brunette, M., Torrey, W.C., Coots, L., Lynde, D., Drake, R.E., 2008. The role of staff turnover in the implementation of evidence-based practices in mental health care. *Psychiatr. Serv.* 59 (Jul (7)), 732–737. doi:<http://dx.doi.org/10.1176/appi.ps.59.7.732>. <https://www.aquanw.nhs.uk/resources/restrain-yourself-toolkit/20917>).