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# **A review of interventions to reduce mechanical restraint and seclusion among adult psychiatric inpatients**

Duncan Stewart PhD

Marie van der Merwe MSc

Len Bowers PhD

Alan Simpson PhD

Julia Jones PhD

All City University

\*Corresponding author:

School of Community and Health Sciences

City University

Philpot Street

London E1 2EA

T: 020 7040 5453

ABSTRACT

## **Objective**

This review examines nature and effectiveness of interventions to reduce the use of mechanical restraint and seclusion among adult psychiatric inpatients.

## **Method**

Electronic searches were conducted to locate post-1960 empirical studies of restraint and seclusion reduction in English. A total of 36 studies were identified, mostly from the USA. Analysis was conducted using a structured data extraction tool.

## **Results**

The majority of studies reported reduced levels of mechanical restraint and/or seclusion, but the standard of evidence was poor. There were no randomised trials. Most were retrospective studies of official records before and after the intervention was introduced, with varying follow-up periods. The interventions were diverse, but tended to include one or more of the following: new restraint and/or seclusion policies, staffing changes, staff training, review procedures and crisis management initiatives. The research was unable to address which of these elements was most effective. There was also evidence that some improved outcomes were achieved by substituting restraint or seclusion for each other or for alternative forms of containment (medication in particular). Nurses' attitudes, skills and approach to patient care were absent from the literature.

## **Conclusions**

Interventions probably can reduce the use of restraint and seclusion, but better designed research is required to demonstrate their effectiveness conclusively. More attention should also be paid to understanding how interventions work, particularly from the perspective of nursing staff. This is essential to the successful implementation of restraint and seclusion interventions across different psychiatric settings and treatment populations.

## INTRODUCTION

Nurses often have to manage aggressive, violent or challenging behaviour among psychiatric inpatients. In some instances, maintaining the safety of the patient and others has been achieved by the use of mechanical restraint and/or seclusion. Reliable estimates for prevalence of these practices are hard to come by because their use varies markedly between countries and hospitals. A rare international comparison found no use of mechanical restraint for a sample of patients in England compared to half of patients in Greece and 10% of patients in Italy, but seclusion was most frequently used in England (1). However, there were significant differences in levels of containment between individual hospitals within countries. US national surveys of state psychiatric hospitals have found that patients in larger hospitals to be less likely to be restrained or secluded because they tend to treat less acute patients (2, 3). As previous reviews have highlighted, cultural differences between wards and hospitals help explain variations in clinical practices and the experience and characteristics of staff influence decision making, perhaps exacerbated by a lack of research evidence to guide clinical practice (4, 5).

Mechanical restraint and seclusion are increasingly regarded as emergency measures. Revelations about the extent of harm to patients, including loss of life, are in large measure responsible for initiatives from US authorities to increase oversight and regulation (5, 6). There is no doubt that patients can find experiencing witnessing restraint and seclusion traumatic (7, 8). Once aware that restraint is going to take place patients can feel high levels of anxiety, fear and anger, sometimes resulting in an escalation of the situation (9). Nurses face an ethical dilemma in these circumstances and the decision to use restraint or seclusion is influenced by personal

morals, values and emotions. Nurses have described inner conflict in deciding whether to use restraint and a feeling of failure as a nurse if they were unable to find an alternative (10) and have difficulty coping with these issues (11). A statistical model of staff attitudes found that the decision to use containment is most influenced by whether it is considered to be safe (i.e. does not harm the patient) and effective (i.e. calming and preventing injury to others), rather than consideration of nurses' own safety (12). The choice of containment method may also be guided by how nurses would want to be treated if they were in the patient's situation, with restraint and seclusion the least favoured options (13). These concerns are likely to be heightened by the perceived and very real risk of physical injury to both staff and patients during restraint and seclusion (4, 14).

This review examines nature and effectiveness of interventions to reduce the use of restraint and seclusion among adult psychiatric inpatients. Almost all the research concerning interventions comes from the USA. As a consequence, the review concerns mechanical restraint and is defined as the use of straps, belts or other equipment to restrict movement, as distinct from physical contact during the process of putting patients into mechanical restraints. Seclusion is defined as the voluntary or involuntary temporary isolation of a patient in either a specifically designed room, usually non-stimulating, bare or sparsely decorated (seclusion room), or any other single room, locked from the outside usually with a window for observation.

## METHOD

Electronic searches of the main databases were conducted to locate post-1960 empirical studies of restraint and seclusion reduction in English. The databases

searched were: PsycInfo, Cochrane, Medline, EMBASE Psychiatry, CINAHL and the British Nursing Index. Key words utilised were restraint, seclusion, isolation, solitary and confinement, psych\$ and mental\$. Consistent with the aims of the review, the following thesaurus terms were excluded: child, eating disorder, diet, dementia and elderly. Resulting titles and abstracts were then inspected for relevance. As the literature accumulated, further references were obtained by following up citations. The final number of identified empirical studies of interventions to reduce restraint and/or seclusion was 36. The majority (n=32) were from the United States (US), but two were from the United Kingdom, one from Australia and one from Finland. A structured data extraction tool was created with various headings including sample, methodology, admission status, ward type, service setting, risk status, time spent on ward, rates of restraint and seclusion, antecedents/causes, patients' views, staff views, outcomes, etc. Where published papers provided empirical evidence, this was entered on the tool. The headings of the resultant matrix have then been summarised for the purposes of this review.

## FINDINGS

In the absence of any controlled trials, the evidence included in the review is based upon observational studies of interventions. The setting, design, intervention(s) and outcomes for each study are described in Table 1. Most (n=22) studies employed a repeated measures design with rates and/or duration recorded before and after implementation. In other cases (n=14), events were monitored only after the introduction of the intervention(s), which could involve several stages of implementation. The studies tended to use retrospective analyses of official incident records or case notes, although the precise methodology was not always clear. Details



of hospital type, bed numbers or patient profile were not always provided. From the information available, the review includes research conducted in various types of setting including public/state psychiatric hospitals (n=18); psychiatric units in general/VA hospitals (n=10); forensic/maximum security units (n=3); and a psychiatric emergency service. All but three studies were based in a single hospital. Bed numbers ranged from 8 to 1,150. Where studies presented results for a mix of wards types, results for some wards (e.g. adolescent) were excluded from the review.

### **Multi-faceted interventions**

The majority of the interventions were comprised of multiple elements (see Table 1). Their content varied so widely that they could not be meaningfully classified for comparative analysis. As some authors acknowledge, the research is limited because the relative effectiveness of specific elements of these interventions has not been assessed. The exception is a series of studies of a state psychiatric hospital in Virginia show reduced restraint/seclusion after consultation for high restraint/seclusion cases (15), increased staffing (16) and improved case reviews (17). When these and other interventions introduced at the hospital were examined together statistically, the revised case review procedure was the only significant predictor of reduced restraint/seclusion (18). The procedures lowered the threshold for review to include lower risk patients and ensured that reviews and modifications to treatment occurred more quickly. Despite the variety of interventions and the lack of comparative evaluation, some common elements can be identified and are described below.

### *Changes in state or local policy*

Introducing new policies to reduce the use of restraint and seclusion is a direct method of changing nursing practice. This has been a feature of US regulatory agency policy over the last decade which now explicitly defines restraint and seclusion as emergency measures and that alternative interventions should be tried first. Two studies of single psychiatric hospitals found that new Health Care Financing Administration (HCFA) rules requiring hospitals to assess patients within one hour of initiation of restraint did appear to reduce restraint and seclusion (19, 20). Similarly, restraint/seclusion hours reduced after the introduction of Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) standards in an acute mental health unit (21). This study gave much less prominence to the promotion of PRN medication as a first course of action as well as patient involvement in aggression management planning, which may also have contributed to the reduced restraint and seclusion (see below). A repeated national survey of Finnish psychiatric hospitals was used to examine the impact of legislative changes on restraint and seclusion between 1990 and 2004 (22). The changes concerned patients' rights and reporting of restraint and seclusion, but stopped short of restricting their use. The risk of patients being restrained or secluded did not change during this period, perhaps because they were not regulated sufficiently. However, the duration of seclusion episodes significantly increased. The authors propose that this was the consequence of clinicians avoiding having to re-seclude patients and the procedural complexity this would entail. Some studies describe local policy changes. Two hospitals introduced a seclusion first policy in order to reduce the use of restraint, with positive results (23, 24). In a UK study of three acute wards a new seclusion policy was introduced

requiring a doctor to be present within five minutes and antecedents, previous interventions used and a seclusion plan to be documented (25).

In some instances the timing of an intervention allows some inference about the relative contribution of wider policy changes. For example, one study of a hospital in New York reported reductions in restraint/seclusion despite the 'one hour rule' (re-assessment of a patients within one hour of initiating restraint or seclusion) and other regulations being in place for some time before a range of interventions were introduced (26). In another study, JCAHO standards were introduced in the middle of the study period, but did not appreciably contribute to the already reduced levels of restraint/seclusion episodes (27). However, the way in which policy changes translate into practice was not examined by these studies. Requiring more frequent assessments of restrained patients may simply represent a bureaucratic obstacle for staff who are subsequently deterred from initiating restraint, rather than representing a proactive endorsement of a more positive psychiatric philosophy. This requires further investigation.

### *Staffing*

Eight programmes involved changes to staffing levels and/or deployment. In one case, restraint reduction entailed the adoption of a psychiatric intensive care model which necessitated an increase in the availability and number of registered nurses (28). Restraint hours were reduced from 1,030 to 408 per month and seclusion from 231 hours per month to 107 over a two year period. Another specifically employed a new nurse consultant to assist staff in their efforts to decrease violence on the wards and new nurse manager posts were established (29), but was less successful in

reducing restraint and seclusion. Three studies described staffing levels in terms of the ratio of staff to patients. In one, a decrease in hospital beds over a decade was accompanied by an increase in staff numbers (30). Two studies from the same state psychiatric hospital found statistically significant correlations between higher staff-patient ratios and lower use of seclusion and restraint (15, 18). One study reported the introduction of a staff roster system to enable nurses to work with a variety of patients in order to reduce burnout associated with continuous work with acutely unwell patients (31). Psychiatric emergency teams of nursing staff have been created to provide a speedy and co-ordinated response to incidents on the wards (27, 30) while one programme used a mix of nurses and security staff for this purpose (32).

### *Staff training*

The interventions described in 14 studies involved some form of staff training. The training content tended to focus on aspects of crisis intervention or non-violent interventions as alternative to restraint, such as de-escalation techniques (26-28, 31-38) or aspects of violence awareness or risk assessment (24, 36, 37, 39). One study reported that requirements for staff training had been formalised but provided no details (20). More precise detail of the content and duration of training programmes was generally lacking. However, staff training was the principle intervention in one study (37). The study describes a one-day assault prevention course in which staff members were required to experience five-point restraints, as well as more conventional awareness of patient agitation and techniques to increase safer reactions to violence. After a year, the rate of restraint reduced by 14% and there was a reduction of over 50% in the duration of seclusion. Another approach involved a series of brief (30 minute) sessions on collaboration, verbal de-escalation, one-to-one

discussions, crisis intervention and diversion techniques, anticipation of violence, therapeutic interventions with personality disorder patients, ethics, medication and record keeping (38). Training was provided to both qualified and unqualified nursing staff.

### *Review procedures*

Interventions commonly included a formalised review process. This included structural reviews of restraint and seclusion and progress with the intervention programme through regular team meetings (35, 37), or senior staff reviewing and monitoring the frequency of restraint and seclusion cases (15, 18, 36, 38).

Alternatively, reviews were patient specific and intended to reduce the chances of restraint or seclusion episodes occurring again for these individuals (26, 32, 33). In one case this review was conducted by the nurse during the seclusion or restraint episode and was accompanied by a later review of documentation (19). The review process was the primary aim of the intervention in another study (i.e. it focused on repeated restraint only), which found a reduction in restraint episodes from 21 per 1000 bed days to 14 over a 12 week period (40).

### *Crisis management*

Collaboration between nurses and patients in identifying strategies to reduce the need for restraint and seclusion was an important aspect of some interventions. Hellerstein et al. (36) describe a coping agreement questionnaire completed with all new patients. It asks patients what makes them upset and how they typically respond, as well as how they would prefer to be treated (including physical interventions, should they be required). Significant reductions in seclusion were reported but not restraint. Two

successful interventions involved identifying personal stress triggers and methods of managing agitation or anger (26, 34). Another study reported the use of nursing led anger management plans for the most high risk patients only (29). Patient education has been incorporated into interventions with the aim of improving patients' ability to control their own anger and emotions (32, 38). An anger management assessment tool has also been developed to assist treatment planning (41).

## **Medication**

The review includes a small number of studies which examined the effects of medication changes in terms of restraint and seclusion outcomes. These studies suggest that the choice of anti-psychotic medication regime can influence levels of restraint and seclusion. Reductions in restraint were found for patients treated with Clozapine (42-44), but results were mixed for risperidone, with improvements found for episodes and duration of seclusion but not restraint (45). There was also no change in the number of patients restrained after the introduction of oral olanzapine on a PRN basis in place of haloperidol (46). An Australian study found an association between reduced seclusion and less use of haloperidol, although it is not clear if this reflects a general downward trend in medication use at the psychiatric unit (31).

## **Interpreting the evidence**

### *Research design*

This review provides only weak support for the effectiveness of interventions to reduce restraint and seclusion. Most studies relied on descriptive analysis before and

after implementation of the intervention with follow-up periods varying from one month to several years. These designs do not allow changes in the use of restraint to be directly attributed to the interventions. There are a number of factors which might account for changes, such as patient characteristics or other aspects of treatment, but these were rarely controlled for in the outcome analyses. There was only one case comparison study, which retrospectively examined the influence of occupational therapy (OT) on restraint use (47). Only those in hospital for at least 90 days were eligible to participate (15% of total annual admissions). The OT patients (n=60), who received therapy at least once per month, showed no statistically different restraint or seclusion outcomes than an equal number of non-OT patients. This negative finding may reflect the highly selective sample as much as the lack of effectiveness for the programme.

### *Choice of measures*

Interpretation of the evidence is made more difficult by the diverse range of outcomes (restraint, seclusion or restraint and seclusion) and units of measurement (patients, episodes, hours, total numbers, per month, per admission or per patient days) used by the studies. Results by choice of measure are summarised below.

### Restraint

All three studies reporting the number of patients restrained found no reductions (36, 40, 46). Restraint episodes, often averaged by month and/or patient, were the most common outcome measure and almost all the studies using it reported a reduction (30, 32, 37, 40, 43, 44, 48). There was no significant change in one study (45), while another study showed an apparent increase (29). Three studies found reduced total

hours in restraints (24, 28, 35) while one found no significant change (36). The evidence was mixed for mean time in restraint. Four studies reported reductions (20, 30, 34, 44), but three found no effect for the interventions (29, 45, 47).

### Seclusion

Two studies found a reduction in the number of patients secluded (31, 46) while one found no significant change (36). As with restraint, almost all the studies which measured seclusion episodes reported favourable outcomes (25, 30, 39, 43-45). The same study with a negative outcome for restraint episodes also showed an increase in seclusion (29). The time patients were secluded was reduced in eight studies, whether expressed as total hours (28, 36) or averaged by patient and/or month (30, 31, 37, 44, 45). However, two studies found no significant change (25, 47) and two indicated an increase (29, 35)

### Combined restraint/seclusion

Reductions were found for the number of patients restrained/secluded (26, 49), duration of confinement (15-19, 21, 23, 41, 50), and episodes of confinement (19, 23, 26, 27, 38, 50). Only one study reported no significant change in restraint/seclusion hours (47). One study reported a reduction in physician orders for restraint/seclusion (33).

Overall, there is more evidence for reduced episodes of restraint or seclusion than for other units of measurement. Thus, it would appear that interventions are most successful in reducing the need to use restraint and seclusion but could do more to reduce the length of time patients remain confined. The results for studies which



combined restraint and seclusion into a single measure tended to be better than those which measured restraint and seclusion separately. There was no indication that the content of approaches to reducing restraint or seclusion was systematically different and it is not possible to determine which is more likely to be successful. The evidence is mixed in terms of the number of patients restrained. Patients who continue to be restrained or secluded after the intervention may be the most difficult to manage cases, who are likely to be confined on numerous occasions and for longer periods. Unfortunately, the studies did not indicate the extent to which patients are subject to repeated episodes of restraint or seclusion.

#### *Other outcomes*

Relatively few studies reported outcomes for violence or other behaviours (n=10), but they suggest that attempts to reduce restraint and seclusion are not accompanied by increases in challenging patient behaviour. Reductions were found for violence and aggression (21, 26, 29), self-harm (21, 26), staff injuries (29, 37, 41), and patient injuries (36, 41). Some studies reported no change for these variables (20, 30, 32). One study found a statistically significant increase in assaults on staff, but this was accounted for by a peak of incidents shortly after the intervention was implemented (32). When this period was removed from analysis there was no significant change. Another reported a 19% reduction in staff injuries a year after introducing a staff training programme (37). A study from a maximum security forensic hospital reported that abuse and neglect allegations significantly reduced over a three year period (23). Reduced numbers of patients absconding has also been reported (36). The relative lack of evidence for behavioural outcomes means the extent to which

interventions reduced the occurrence of incidents on wards, or the need for staff to use of restraint and/or seclusion to manage incidents, is uncertain.

### *Substitution*

Another possible explanation for some of the positive findings is that restraint was substituted with seclusion or visa versa. Craig et al. (28) found a large reduction in restraint hours a year after implementing a package of restraint reduction measures, but hours of seclusion initially increased despite the explicit intention of preventing this from happening (there was a subsequent decline to much lower levels). A programme of least restrictive alternatives also reduced levels of restraint but time spent in seclusion increased (35). A study of restraint and seclusion over a seven year period showed no reduction in restraint after a programme implementation, but there was a statistically significant decline in seclusion (36). As the authors note, however, this is probably explained by the low baseline rate of restraint compared to much more frequent use of seclusion. Substitution was also a goal of some interventions. One stipulated that patients be placed in seclusion before mechanical restraints was considered (24). Unsurprisingly, the total hours patients spent in restraints reduced dramatically, but data on the use of seclusion were not presented. A secure forensic unit changed its policy of never using seclusion to one of preferential use of seclusion over restraint (23). This was viewed as more in line with the social learning programme which had been introduced. The intervention seemed to reduce the number of restraint/seclusion episodes and their duration reduced during the following two years, but rates of restraint and seclusion were not measured separately. Combining the restraint and seclusion may obscure quite different outcomes for each and could account for the more positive findings for those studies. A US national

sample of state psychiatric hospitals found statistically significant correlations between use of restraint and seclusion, particularly in terms of the hours spent in restraint and seclusion (2). Yet, these relationships vary between hospitals (51, 52) so it cannot be assumed that the impact of an intervention on restraint, seclusion and other methods of containment will be uniform.

Restraint and/or seclusion may also be substituted by other methods of containment. There is evidence that medication would be nurses' choice of intervention to calm aggressive patients (13, 53, 54), with seclusion preferred over restraint. A state psychiatric hospital aggressively promoted the use of Clozapine for its patients as part of a broad programme of measures to reduce restraint and seclusion (33). One study adapted the case review procedures of a restraint/seclusion reduction programme and applied them to the use of PRN and found statistically significant reductions (17). The limited data available on patient behaviour has already been noted, but combined with virtually no information on the full range of treatment options available to nurses it is difficult to see how the implications of studies which report reduced restraint and/or seclusion can be understood fully. The lack of information was often acknowledged as a limitation, sometimes accompanied by statements that other aspects of treatment did not change during the study, but no data was presented to support this. A few studies indicate that staff can successfully use least restrictive alternatives to restraint and seclusion. One assessed the role of staff training in least restrictive alternatives to restraint (35). Verbal interventions, decreasing stimulation and time-out were used for almost two-thirds of incidents of disruptive behaviour, although PRN medication was used on a quarter of occasions. A study which

measured restraint/seclusion three years before and after a multi-faceted intervention found that reductions in restraint/seclusion episodes were not accompanied by increases in IM medication or observation (26). Talking to staff, walking with staff, and time-out were frequently used alternatives. Restraint and seclusion has also been explicitly substituted with time-out, and despite some erratic use during the early and later stages of the project fewer patients were restrained and/or secluded (49).

## CONCLUSIONS

The weight of evidence suggests that interventions can successfully reduce the use of restraint and seclusion, but this conclusion is subject to a number of caveats. Firstly, the research designs were weak. There were no randomised trials or case control studies, follow-up periods varied enormously and results were frequently limited to descriptive analyses. Restraint and seclusion continue in the absence of any controlled trial to support their efficacy, but there is an opportunity for randomised studies to compare restraint and seclusion to the kinds of alternative interventions described in this review (55). Secondly, most of the studies describe programmes involving a package of interventions, but only one study examined which was most effective. It is, therefore, unclear whether changes in national or local policy, structural changes to the organisation and delivery of services, or revised nursing practice which makes the greatest difference. It is not possible to use the existing evidence to define an 'ideal' mix of restraint and seclusion reduction interventions. Thirdly, reductions in restraint and/or seclusion may have been accompanied by use of other, unmeasured forms of containment. Finally, since most evaluations were

conducted by those implementing the evaluations, it is likely that some publication bias has resulted.

Such shortcomings partly reflect the lack of adequate data available to researchers. Analysis is often based upon simple counts of events obtained from hospital records. Developing national reporting systems and datasets would be one way improving the quality and consistency of information. Systematic data collection of this sort would improve the feasibility of conducting larger scale, multi-site studies which examine implementation of changes over a prolonged period of time. These studies are needed to control for local variations in patient populations and clinical practice, to assess whether early improvements can be sustained over longer periods and to monitor formal or informal modifications to interventions over time. This might also facilitate presentation of data in a form standardised to beds, admissions or occupancy which would greatly enhance comparability of findings. Many authors acknowledge these limitations, but the evidence is further undermined by a lack of rigour in analysis. The observed reductions were often substantial, which might explain the reliance on descriptive accounts of change, but only 16 studies used any kind of statistical procedure to measure changes in restraint and/or seclusion. Multivariate analysis of a broader range of measures, including separate data for restraint and seclusion, should be used wherever possible in order to avoid potentially misleading conclusions.

The strengths of observational methodologies could be better exploited. Research is needed not only to demonstrate the efficacy of interventions but to examine how they work in practice. Underpinned by legislative changes, many of the studies describe a sense of moral mission, not just to reduce restraint and/or seclusion but to improve the

overall experience of patients by providing a more dignified and therapeutic treatment regime (56). The benefits of interventions are discussed in terms of the specific actions taken to reduce restraint and/or seclusion, but also the subsequent change in attitudes, culture and atmosphere on the wards. This is manifest in descriptions of improved leadership roles and communication within multidisciplinary teams. For example, the introduction of therapeutic community principles to a ward reduced the use of seclusion, but also improved staff skills, knowledge, self-esteem and renewed sense of optimism (39). One of the few multi-site studies concluded that a non-restraint movement incorporating hospital and community advocates coupled with new state regulations on restraint were the reasons for changes in attitude, culture and environment within the hospitals (30). Similarly, the authors of a large five year study in an acute psychiatric unit conclude that, “the specific details of the initiatives may be less important than the elements they embody, which are the following: a multidisciplinary effort, education of alternatives to restraint use, continual feedback to the staff about their progress, and visible administration support both for the staff’s concerns about safety and the importance of the restraint reduction project” (32, p.222). Yet, staff and patient perspectives on the interventions were notably absent from the intervention literature. One study linked improved team working to staff attrition rates, staff attitudes, and willingness to address other problems that arise (28). In another, response teams to review restraint episodes was reported to improve supervision, communication between staff members at different levels and opportunities to discuss individual patient’s treatment plans (40). These provide anecdotal evidence of teamwork skill and apparent positive attitude leading to lower restraint and seclusion, but were not examined explicitly by any study. In this regard, the research is characterised by too much inference and not enough evidence. Much

more attention should be paid to devising measures of the mechanisms and processes which bring about change and assessing how these interact with patient characteristics and behaviours. This is essential if programmes to reduce containment are to be successfully implemented across different psychiatric settings and treatment populations.

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