The effectiveness of de-escalation techniques as compared to physical restraint/seclusion on inpatient psychiatric units: a quantitative systematic review.

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Executive Summary

Background

Traditionally restraint and seclusion were viewed as a form of treatment, however the use of restraint and seclusion has led to increased physical and mental injuries to staff and patients. Currently de-escalation has been viewed as a safer option for aggressive and violent patients. Understanding which intervention yields decreased injuries, aggression and violence will guide legislation, practice and institutions leading to safer patients and staff.

Objectives

To identify which intervention leads to decreased physical and psychological injury to patients and staff.

Inclusion criteria

Types of participants

Adults 18 years of age and above, who are aggressive/violent patients being cared for within in-patient psychiatric units, and mental health staff who work with inpatient psychiatric patients.

Types of studies

Experimental and epidemiological study designs, including randomized controlled trials (RCTs), non-randomized controlled trials, prospective and retrospective cohort studies, before and after studies, quasi-experimental studies.

Outcomes

Outcomes measures include frequency of physical injuries to patients and staff from aggressive patients, frequency of psychological injuries to patients and staff from violent, aggressive incidents, frequency of violence, agitation and aggression, competence of staff at managing aggression and violence.

Search Strategy

A comprehensive multi-step search was completed to find both published and unpublished studies. Only those studies reported in English were included. The search strategy was not limited by date of reporting.

Methodological quality

Studies were assessed for methodological quality using standardized critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument.

Data extraction

Data extracted from studies included in the review were analyzed using the standardized data extraction tool from JBI-MAStARI (Appendix II).

Data synthesis

Due to heterogeneity between studies statistical meta-analysis could not be conducted. The results have been presented in narrative form.

Results

Fourteen studies were included in this review. There are many forms of de-escalation and based on the studies where techniques were taught to staff, the intervention was effective in decreasing injury in approximately half the studies. De-escalation techniques taught to patients decreased injury in 100% of the studies included in this review.

Conclusion

Consensus on which intervention works best between de-escalation techniques or R/S could not be reached, nor is there overwhelming evidence for a particular type of de-escalation that works best for decreasing aggression and violence. Caution should be exercised when choosing a de-escalation technique for implementation in institutions due to lack of regulating agencies that inform practice and standards. In addition, the literature is lacking best practices for de-escalation techniques that are backed by evidence. Restraint and seclusion should still be used as a last resort due to inherent risk associated with the intervention.

Keywords

Workplace, violence, aggression, nurses, care staff abuse, assault, interventions, effectiveness

Background

Restraint and seclusion (R/S) use in inpatient psychiatric units have been historically viewed as therapeutic (Lewis, Taylor, & Parks, 2009). The use of restraints is well known in the United States and many countries worldwide (Barton-Gooden, Dawkins, & Bennett, 2013). Physical restraint is defined as any device, material or equipment that is connected to or close to a person's body which cannot be controlled or easily removed by the person and is meant to deliberately prevent free body movement to a position of choice and/or limits normal range of motion and access to their body for a specified amount of time (Barton-Gooden, Dawkins, & Bennett, 2013). The Centers for Medicare and Medicaid Services (CMS) have defined seclusion as the involuntary containment of a person alone in a room or area from which that person is physically prevented from leaving for a specified amount of time (Substance Abuse and Mental Health Services Administration, 2010). Seclusion provides containment, isolation, and reduction in sensory stimuli (Muralidharan & Fenton, 2006). The benefits of seclusion can be seen as the aggressive patient is removed from increased external stimuli and provides a time for intensive

observation (Muralidharan & Fenton, 2006). Restraints and seclusion have been grouped together as they both represent a physical intervention that involuntarily holds a person against their will. A patient's violent, aggressive, and destructive behavior can necessitate the need for R/S (American Psychiatric Nurses Association, 2014). At times R/S may be the only way to prevent impending escalation in aggression or violence (Muralidharan & Fenton, 2006).

Seclusion is used for patients who are behaving violently or destructive behavior toward self. (American Psychiatric Nurses Association, 2014). According to Sailas, & Fenton, (2000), the theoretical foundation for R/S although debated in the literature, is based on whether it is a valid therapeutic intervention, a method of containment in emergent situations, or a form of punishment. The effects of R/S on frequency of aggressive occurrence is not known (Sailas, & Fenton, 2000). There appears to be a lack of controlled trial-derived evidence regarding effectiveness of R/S even with the invasiveness of the intervention and its continued use over the years (Sailas, & Fenton, 2000). In a critical review of control and restraint techniques conducted by Wright, (2003), it is suggested that training in physical restraint techniques can reduce the number and severity of injuries related to violence and assaultive incidents.

In a literature review, Fisher (1994) surmised that R/S is effective in preventing injury, managing agitation and is an unavoidable part of treating those with severe mental illness. Interestingly enough, in 1839, over a century before Fisher, a British psychiatrist John Conolly wrote an article titled "The treatment of the insane without mechanical restraint" which began his advocating for the removal of restraints in practice (Lewis, Taylor, & Parks, 2009). In 1844, R/S were the topic of concern at a meeting of the Association of Medical Superintendents of American Institutions for the insane (Lewis, Taylor, & Parks, 2009). Nonetheless, during the first decade of the 21st century R/S use in psychiatry remained unchanged from prior centuries (Lewis, Taylor, & Parks, 2009). Today R/S use is generally recognized as a high risk for injury practice (Lewis, Taylor, & Parks, 2009). The lethal potential has been recognized in many reports and articles. In 1992, it was estimated by the United States Department of Health and Human Services that 100 people die every year due to use of R/S (Lewis, Taylor, & Parks, 2009).

In 2000, the Centers for Medicare and Medicaid Services (CMS) implemented changes that provided use of restraints as a last option for aggressive/violent patients (Lewis, Taylor, & Parks, 2009). In addition, in 2001 the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) revised their R/S policies also recommending restraint use as a last option where there is high risk for injury to the patient or others (Lewis, Taylor, & Parks, 2009). There have been several state and federal court cases that continue to uphold the right to least restrictive conditions for aggressive and violent patients, (Lewis, Taylor, & Parks, 2009). Current rates have shown a decline in R/S in the US as a result of regulatory agencies.

Threatening or violent behaviors exhibited by patients in psychiatric hospitals result in injuries to staff and patients, and creates increased treatment, occupational, and financial challenges for institutions (Short, et al., 2008). Violence by psychiatric patients still happens at significant rates despite advances in behavioral and pharmacologic treatment (Hellerstein, Staub, & Lequesne, 2007). Health care workers agree that aggression and violence on psychiatric inpatient units is increasing (Foster, Bowers, & Nijman, 2007). It is estimated that in a 12-month period at a psychiatric hospital located in the UK a nurse would have a 1 in 10 chance per year of experiencing some kind of injury as a result of patient aggression (Foster, Bowers, & Nijman, 2007). The act of aggression and violence can be profound on staff and patients with effects manifesting in increased feelings of anger, emotional hurt, and an increased rate of sick leave for

staff (Kynoch, Wu, & Chang, 2011). In a study conducted by Bonner et al., (2000) it was noted that there was an increase in anxiety, trauma and mental anguish related to the use of interventions geared toward aggressive and violent patients. According to Nelstrop et al., (2006), patients verbalized feelings of powerlessness, voicelessness, and that treatment with R/S is inhumane and controlling.

Aggression is shown in ways that range from increased tone to unprovoked attacks with or without a weapon (Foster, Bowers, & Nijman, 2007). Evidence has shown that aggressive behavior poses a threat to the physical and psychological wellbeing of patients and psychiatric staff. The fear associated with working with aggressive patients and the potential for violence has a damaging impact on patient care (Foster, Bowers, & Nijman, 2007).

Management of aggressive patients is achieved by several measures. Ideally aggressive threatening behavior should be defused by verbal de-escalation and when that is not effective, medication, seclusion or physical restraint may be necessary (Foster, Bowers, & Nijman, 2007).

In 2008, the Joint Commission (JCAHO) developed its National Patient Safety Goals for Hospitals. These standards recognized that sound treatment is inherent to the delivery of safe, high-quality inpatient services; and goals to eliminate or decrease injuries should focus on systemwide, evidence-based solutions (Short, et al., 2008). In addition, the Centers for Medicaid and Medicare (CMS) and Joint Commission (JCAHO) stressed the need to respect patients' autonomy by limiting and reducing the use of restraints in psychiatric settings (Khadivi, Patel, Atkinson, & Levine 2004).

Violence in healthcare remains a serious concern (Kuehn, 2010). Factors associated with increased risk for violence include weakness in leadership development or inadequate development and inadequate implementation of policies addressing workplace violence, staffing, staff training, patient observation, patient assessment, communication failure among staff, patients and family, and deficient security and environmental safety (Keuhn, 2010).

Current research has shown a significant decrease in use of R/S can be achieved by creating an environment that decreases the chances for increased distress and aggression (Lewis, Taylor, & Parks, 2009). Crisis prevention management programs have been an effective response to change in the culture of R/S use (Lewis, Taylor, & Parks, 2009). Research has shown R/S use has decreased by 64% in psychiatric units that have implemented structured de-escalation techniques, mandatory training and quality improvement staff training (Forster, Cavness, & Phelps, 1999).

De-escalation techniques focus on early recognition of signs of agitation and encourages early intervention (Khadivi, Patel, Atkinson, & Levine 2004). When aggression and angry behavior progress in a predictable, orderly manner, this presents an opportunity for staff to intervene with methods such as de-escalation (Muralidharan & Fenton, 2006). De-escalation techniques are based on communication theory and make use of many different verbal techniques to de-escalate the aggressive or angry patient avoiding serious violence (Muralidharan & Fenton, 2006).

Techniques used in de-escalation include observing for signs and symptoms of increasing anger and agitation, approaching the patient in calm controlled non-threating manner while providing choices and allowing the patient to maintain dignity (Muralidharan & Fenton, 2006). Every effort is centered on avoiding confrontation (Muralidharan & Fenton, 2006). De-escalation techniques also highlight the use of therapeutic use of one's own personality and relationship with the patient to aide in decreasing aggression and agitation (Muralidharan & Fenton, 2006). A study conducted by Muralidharan and Fenton, (2006), concluded current non-pharmacological

approaches to containment for those with aggressive, violent behavior are not supported with evidence from controlled studies and the use is difficult to justify.

In a retrospective study conducted by Khadivi, Patel, Atkinson, & Levine (2004), the effect of a de-escalation technique designed to decrease the use of R/S in aggressive, violent psychiatric in-patients was evaluated. The retrospective study assessed the use of R/S 12 months before and after the intervention (Khadivi, Patel, Atkinson, & Levine 2004). Results showed a 52% reduction in R/S, but the number of assaults on staff and patients increased significantly from 67% before intervention to 85% after intervention (Khadivi, Patel, Atkinson, & Levine 2004).

Successful de-escalation of a patient with potential for increased aggression and violence requires that staff be trained to assess for escalating aggression (Khadivi, Patel, Atkinson, & Levine 2004). No controlled studies exist that evaluate the value of seclusion or restraint in those with serious mental illness (Sailas & Fenton, 2000). Richmond, et al., (2012) suggest traditional methods of treating aggressive patients like R/S be replaced with a non-coercive approach to aggression and agitation, namely de-escalation which has the potential to decrease agitation and violence although reliable scientific studies on effectiveness are lacking.

A systematic review conducted by Du, et al., (2017) investigating the effects of de-escalation techniques in the short-term management of aggression or agitation found using de-escalation techniques appears to be accepted as good clinical practice, but it is not supported by evidence from randomized controlled trials.

A qualitative study examining the perceptions of factors that influence staff injuries obtained during physical interventions due to patient violence, done by Lovell, Smith, & Johnson, (2015) found that the proportion of physical intervention episodes in mental health units that resulted in injuries varies from 12% to 40% compared to de-escalation interventions which result in injuries in the 5%-7% range. The study posits that nurses are challenged with needing to respond quickly to aggression and violence. In addition, getting to know psychiatric patients and understanding factors that lead to aggression and violence is necessary in an effort to nurture wellness and help patients with community re-entry (Lovell, Smith, & Johnson, 2015)

A systematic review conducted by Goulet, Larue, & Dumais, (2017), found that interventions geared toward restraint reduction were likely to reduce the frequency of R/S use by 76%, but there remains a lack of evidence-based de-escalation programs to choose from. According to Goulet, Larue, & Dumais, (2017), in the review of literature done on R/S reduction programs, what is meant by “programs” is not clear, and the literature review was done without the methodological rigor of a systematic review.

A systematic review of available studies is needed at this time to address the gap in literature regarding which intervention is more effective at reducing injury, including psychological injury. This review will pull together the results of prior studies and generate new knowledge that will inform hospital administration, health care clinicians, and policy makers in best practices for inpatient psychiatric staff and patients.

Keywords

workplace, violence, aggression, nurses, care staff abuse, assault, interventions, effectiveness

Objectives

The objective of this systematic review was to determine which intervention R/S, or de-escalation is more effective at reducing injuries to staff and patients.

Specifically, this review was intended to synthesize the best available evidence regarding

1. Frequency of physical injuries to patients and staff from aggressive patients.
2. Frequency of psychological injuries to patients and staff from violent, aggressive incidents.
3. Frequency of violence, agitation and aggression.
4. Competence of staff at managing aggression and violence.

Inclusion criteria

Types of participants

This review considered studies that included adults of both genders, 18 years of age and above, who are or have been aggressive/violent patients on in-patient psychiatric units. In addition, mental health staff who work on inpatient psychiatric units were included because the majority of studies included in this review taught either R/S or de-escalation techniques to staff and the results of those intervention were studied. This review included patients treated on geriatric units. This review excluded studies that included participants on forensic units, acute care units, emergency department patients, or any other setting outside of inpatient psychiatry.

Interventions

The review considered studies that evaluated the effectiveness of de-escalation techniques versus restraint and seclusion. The interventions included classes taught to staff on R/S techniques and injury prevention. Several studies focused on de-escalation techniques taught to staff on recognizing escalating behavior and interventions to diffuse the behavior. The review also included studies that geared interventions to patients with the focus on anger management and behavior control.

Outcomes

The primary outcome of interest was the efficacy of de-escalation compared to R/S in decreasing aggression and violence as well as mental and physical injury to staff and patients. The secondary outcome was the increased competence of staff in the management of aggression and violence.

Types of studies

This systematic review considered both experimental and epidemiological study designs including randomized controlled trials (RCTs), non-randomized controlled trials, prospective and retrospective cohort studies, before and after studies, and quasi-experimental studies.

Search strategy

The search strategy aim was to find both published and unpublished studies. A three-step search strategy was utilized in this review. An initial limited search of MEDLINE and CINAHL was undertaken followed by an analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. A second search using all identified keywords and

index terms was then undertaken across all included databases. Thirdly, the reference list of all identified reports and articles was searched for additional studies. Studies published in English were considered for inclusion in this review. All available published studies were considered for inclusion in this review. A range of dates based on year of publication was not set to allow a greater sensitivity. The search was conducted in October 2018. The search strategies are listed in Appendix I.

The databases searched included Medline (OVID), CINAHL (EBSCO), Academic Search Premiere, Web of Science, DARE, Scopus, Cochrane, and PsycINFO.

The search for unpublished studies was completed using Virginia Henderson Library, MEDNAR, New York Academy of Medicine Grey Literature Report, Scirus.com, and the Website of the Agency for Healthcare Research and Quality (AHRQ). Dissertation Abstracts Online, Institute for Healthcare Improvement, American Psychological Association, American Psychiatric Nurses Association, American Journal of Nursing, American Journal of Psychiatry, Journal of Psychiatry and Neuroscience, Journal of Psychiatric Research, and World Psychiatry.

Initial keywords used workplace, violence, aggression, agitation, inpatients, nurses, care staff, abuse, patient, violent attacks, assault, restraint, security measures, crisis intervention, risk management, nurse-patient staff relations, hospitals, patient isolation, violence prevention & control.

Assessment of methodological quality

Studies selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in this review using standardized critical appraisal instruments from Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix II). Studies were included if they met any 4 out of the total criteria of the JBI-MAStARI critical appraisal instrument. Any disagreements that arose between the reviewers was resolved through discussion, or with a third reviewer namely faculty team member.

Data Extraction

Data from studies included in the review were extracted using the standardized data extraction tool from JBI-MAStARI (Appendix III). The data extracted included specific details about the interventions, populations, study method and outcomes of significance to the review questions and specific objectives. Attempts were made to obtain missing data from the studies by contacting the authors.

Data Synthesis

Quantitative data could not be pooled for statistical meta-analysis. The findings from this review were reported in narrative form.

Results

Description of studies

The exhaustive search of the literature through a combination of searches in multiple databases resulted in 1321 citations (Table 1). After checking for and removal of (124) duplicates, (1197) studies were screened further and exclusions (1131) were based on information presented in the title and or abstract. Sixty-six full text studies were retrieved and each of the studies were appraised for eligibility; forty full-text studies were excluded either because they did not meet inclusion criteria or did not meet conditions for the review question. Twenty-six full-text studies were then included for critical appraisal. Eleven studies that were included in critical appraisal were excluded from analysis since they did not meet methodological quality criteria, settings, or population. Refer to Figure 1 for the flowchart of study search and selection process.

Methodological quality

The studies that fit the inclusion criteria and had the highest methodological quality were included for critical appraisal. Twenty-six full-text studies were included for critical appraisal. Critical appraisals of the studies are presented in Appendix IV. The critical appraisal results were used to describe the risk bias for each of the included studies (Table 2). Out of twenty-six studies, six studies were excluded from this review for study design. Two studies were excluded for setting. Three studies were excluded for inclusion of children and adolescents. One study was excluded because it was a correlational study. All attempts to contact the authors were unsuccessful except for one study. Reasons for exclusion are presented in Appendix V.

The purpose of this review was to compare R/S to de-escalation evaluating effectiveness at decreasing injury to staff and patients. Included studies were either RCT or quasi-experimental design. Out of the fifteen studies included, two were RCT, twelve were quasi-experimental, and one was a correlational study.

Table 1: Summary of search results

PubMed	937
Scopus	198
CINHAL	20
Web of Science	21
PsycINFO	94
Academic Search Premier	27
Cochrane Review	0
Dissertation and Theses	2
Virginia Henderson	3
Agency for Healthcare	2
Journals	17
Duplicates	124
Total	1321

PRISMA 2009 Flow Diagram

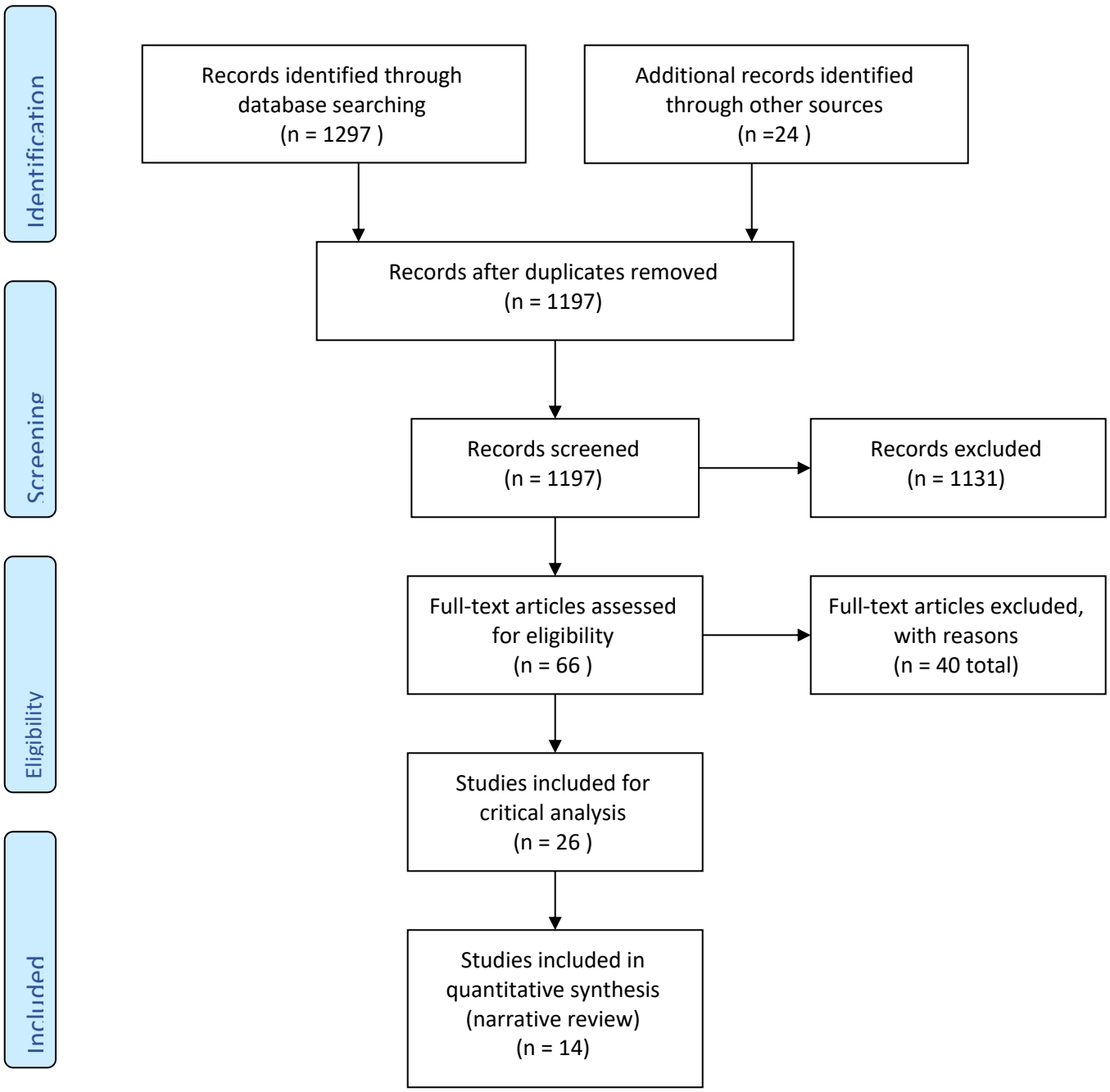

Table 2: Risk of bias in the included studies

Number of studies included	Number of studies excluded
14	12

Assessment of methodological quality of included studies

CITATION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Comparable RCT													
Bowers et al., 2015	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Needham et al., 2004	Y	U	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
%	100	50	100	100	50	100	100	100	100	100	100	100	100

CITATION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Comparable Quasi-Experimental									
Blair et al., 2017	Y	N/A	N/A	N	Y	N/A	N/A	Y	Y
Bowers et al., 2006	Y	Y	U	Y	Y	N	Y	Y	Y
Calabro et al., 2002	Y	N/A	N/A	N	Y	Y	N/A	U	Y
Laker et al., 2010	Y	Y	Y	N	Y	Y	Y	Y	Y
Lanza et al., 2009	Y	Y	Y	N	Y	Y	Y	N	Y
Lavelle et al., 2016	Y	Y	Y	N	Y	Y	Y	Y	Y
Martin, 1995	Y	Y	Y	N	Y	N	U	N	N
Omolewa, 2012	Y	Y	Y	Y	N	Y	Y	Y	Y
Park et al., 2012	Y	Y	Y	Y	Y	N	Y	N	Y
Parkes	Y	Y	Y	N	Y	N	Y	N	U
Shah et al., 1998	Y	Y	Y	N	Y	N	Y	N	Y
Wilson et al., 2018	Y	Y	Y	N	Y	N	Y	N	Y
%	100	76	77	2	90	45	65	45	85

Study setting

Fourteen studies were included in this review. Studies included in this review were published between 1995-2017. The characteristics of the studies included are presented in Table 3. Of the fourteen studies included in this review, five were conducted in the United States (US), seven were conducted the United Kingdom (UK), one was conducted in Korea, and one was conducted in Switzerland. The majority of studies took place at urban university-based hospital's in different cities in different countries, while others were conducted at several inner-city hospitals.

Study population

All the studies included adult psychiatric inpatients and psychiatric mental health staff that work with those on inpatient units. The specific diagnosis of the patients was not a factor for inclusion in the studies as long as they were admitted to an inpatient unit. Adults were considered to be 18 years and above. There was only one study that specifically included the geriatric population 65 and over.

Study outcomes

The outcomes of included studies are provided in Table 3. All studies reported on the effectiveness of interventions to decrease aggression, violence and injury to patients and staff. In eleven of the included studies de-escalation was taught to staff members. Four of the studies offered de-escalation techniques to patients only.

Table 3 Characteristics of included studies

STUDY	METH	POP.	INTERVENTION	COMP	OBJECTVE	DATA EXTRACTED	FINDINGS
Bowers et al., 2015	RCT	Staff and patients in 31 chosen acute psych wards at 15 random hospitals	Package of 10 safewards interventions Standard of behavior, soft words, de-escalation, say something good about patient, scanning for bad news, shared personal info, regular mtg, crate of distraction, reassuring explanations to pts, positive messages N=16	Package of intervention directed at improving staff's physical health. Desk exercise poster in office, pedometer-based competition, healthy snacks, diet assessment with feedback, health and exercise magazines supplied, links to sports N=15	Evaluate efficacy of complex intervention (safewards), Targeted at nursing staff, to reduce conflict and containment rates	Experimental condition reduced rate of conflict events by 15% (95%CI 5.6-23.7%) relative to the control Conflict Est=0.850 95% 0.763-0.943 P=0.001 Containment Est=0.768 95%0.655-0.901 P=0.004 The rate of containment events for experimental intervention was reduced by 26.4% (95% CI9.9-34.3%)	Simple interventions aimed at improving staff relationships can reduce frequency of conflict and containment
Needham et al.2004	RCT	N=985	The course aimed to provide knowledge, capabilities and hands-on skills to the participants, conflict management, communication and interaction, post aggression procedures, workplace safety, prevention of aggression, breakaway techniques.	Standard care	To evaluate the effect of a training course in aggression management on the incidence and severity of aggressive events, attacks against persons and coercive measures	The incidence rate for aggressive events declined from baseline through intervention in the treatment group while it remained constant in the control group, however decline did not reach statistical significance. Relative risk reduction (RRR 19.3%, 95% CI-16%-44%	The incidence rates of severe aggressive events decreased in the intervention group and increased in the control group, but neither change alone reached statistical significance.
Bowers et al., 2006	Retros pective Analys is Before and after	Ward Nursing Staff N=144 at 3 intercity hospitals	5-day PMVA(Preventio n and Management of violence and aggression) course included prediction, anticipation, and prevention of	1-day update Manual restraint skills only.	To explore the relationship between PMVA training of acute psychiatric nursing staff and officially reported violent incident rates	Frequency of aggressive incidents with 5-day PMVA course Verbal aggression Mean .16 SD..51 Physical Aggression Mean .26	Failure to find a drop-in incident rates after training coupled with increases in incidents raises concerns about the training courses efficacy

			violence, violence reduction, response to aggression, de-escalation, communication, problem solving, negotiation, breakaway technique, manual restraint skills.			SD .65 Property Damage Mean .06 SD. .28,,,	
Omolewa, 2012	Quasi-Experimental	N=128 Nurses	Instructive educational program for nurses to reduce physical restraints. Experimental group was exposed to the intervention before tests.	Control group received the instructional after taking test.	The research questions aimed to determine whether changes occurred in nurses' knowledge, attitudes, and practice of physical restraints as a result of the intervention	Knowledge of restraint use (KPRU) increased KPRU scores with a Mean of 11.58 (SD=2.10) on scale of 0-14.	The results are consistent with the findings that indicate the positive effects of in-service physical restraints education on nurses knowledge, attitudes and practice.
Park & Lee, 2012	Quasi-Experimental	N=44 males on inpatient psychiatric unit N=22 experimental N=22 control	Stickers were given to patients who sustained non-violent behaviour that could be used at a later date for reinforcers of choice (i.e.) cup of coffee, bowl of zhajangmian, noodles with black bean sauce, half fried chicken, a walk, outdoor activities, sleeping in, coup of Job's tears tea	Standard care	To evaluate the effectiveness of short-term token economy (STTE) on violent behaviour in patients	Aggressive incident scores M±SD Experimental group (n=22) 53.95±3.12 (baseline) 41.90±2.34 (12-weeks) Control group (n=22) 54.04±1.55 (baseline) 56.22+0.92 (12-weeks)	The results of the study indicate that short term token economy (STTE) is effective at reducing the incidence of aggressive behavior,
Lanza et al. 2009	Before and After Quasi-experimental	Patients and Nursing staff	Violence prevention community meeting (VPCM) for patients to help reduce verbal and physical violence against nurses, patient's and property		To explore the efficacy of the VPCM at reducing injury to staff and patients and decreasing property damage	Mean and Standard Deviation for number of violent events during pre-treatment, treatment and post-treatment Pre-treatment 4.79(1.20) Treatment .73(1.44) Post-treatment 2.84(1.15)	Extent of violence reduction 85% from pre-treatment to treatment and 41% from pre-treatment to post-treatment for all shifts.
Laker et al., 2010	Before and After Quasi-experimental	N=195	Training to manage violence and aggression, equipping staff with capability of safe restraint and de-escalation prevention.		To explore efficacy of de-escalation and restraint training in reducing incidents in PICU. Explore the efficacy of de-escalation and restraints training in reducing severity of incidents	Rate of incidents was 1% lower than pre-training but was not significant Incident rate ratio (IRR)= 0.986, 95% confidence interval (CI) = 0.75-1.29, p=0.920	The results show no significant differences in the pre an post training group in the reduction or severity of the number of incidents.
Blair et al., 2017	Before And After	N= 8029	Staff education, 8-hour crisis intervention course, de-escalation techniques, maximize staff presence, trauma informed care		Decrease R/S	Intervention = significant reduction in rate of seclusion 213/8029=4.4/100 Admission vs. baseline 358/3884=9.2/100 admissions p<0.01 52% reduction Rates of restraints events decreased 6% (non-significantly p=0.44) baseline 213/3884=5.5/100 admissions, study period 412/8029=5.1/100 admissions.	Statistically significant association were found between the intervention and a decrease in both the number of seclusions (p<0.01 and the duration of seclusion (p<0.001)
Calabro et al., 2002	Before and After	N=118	Program emphasized methods to identify nonverbal and verbal behaviours and use of		To increase staff knowledge and self-efficacy about defusing potentially violent incidents and preventing assaults, in addition help staff	Self -efficacy t(114)=-2.82, p<0.01 Mean (SD) Time 1 15.0 (4.0) Mean (SD) Time 2 14.3 (3.3)	Significant positive improvement in self efficacy

			techniques for managing behaviours that could escalate to physical aggression.		manage their fear and anxiety		
Martin, 1995	Before and After	All staff	Aggression management workshop, verbal de-escalation techniques, competence assessment		To improve the safety of staff	N=staff injuries from patient aggression 1991 /1992 n = 75 1992/1993 n = 89 1993/1994 n = 119	The level of actual aggression began to drop after the implementation of the program, despite an increase in total number of aggressive incidents. The data supports that training in management of aggressive patients is associated with improved safety to staff.
Shah & De 1998	Before and after	N=15 Nurses	Educational package to support communication, sharing of know-ledge about aggressive behaviour in the elderly.		This study was designed to prospectively evaluate the effect of an educational package taught to nursing staff for reducing aggressive behaviour among patients on a psychogeriatric continuing care ward.	There was a significant decrease in aggression scores on the RAGE total (Mann-Whitney U test, Z= -4.14, p<0.00001)	There was a reduction in aggressive behavior on both the scales across the three experimental phases.
Wilson et al., 2011	Before and after	N=12 Patients	Anger management program for patients		To decrease violent and aggressive incidents on inpatient Psychiatric Intensive Care Units (PICU)	Satistically significant decrease post-intervention (mean = 2.8), compared to pre-intervention (mean = 0.6); p=0.007	There was a statistically significant reduction in the frequency of violent and aggressive incidents instigated by these patients in the 2-weeks post intervention compared to 2-weeks prior.
Lavelle et al., 2016	Retros pective Case note analysi s	N=522	De-escalation, the use of verbal or non-verbal communication		To identify the conflict and or containment events that precede de-escalation and predict its success in halting conflict. To identify the conflict and containment events that follow unsuccessful de-escalation attempts To investigate the patient characteristic that predict the use of de-escalation and its success	Successful de-escalation sequences had fewer precursors (M=0.91, SD=1.05) than unsuccessful sequences (M=1.39, SD=1.46) Z(752)=-5.42, p<0.001 And were twice as likely to have no precursor events prior to de-escalation (successful 39%, vs. unsuccessful 22%); OR =2.19, 95%CI 1.55-3.11, p<0.01	When implemented, de-escalation was successful in ending sequence of conflict or containment in the majority of cases.
Parkes, 1996	Repeat ed measur es Before and after	N=298 149 incidents before training and 149 incidents after training	Training included no touch training, break away techniques, and the use of three person staff to restrain	Standard care	To compare incidents of restraints and staff/patient injury before and after intervention	Restraint phase Prior to training 25 injuries Post training 38 injuries Chi2=16, DF=1p<0.05	Overall, there was a small increase in the number of staff injuries (51 prior to training, 68 post training). This is not statistically significant

Findings of the review

Narrative Synthesis

Staff education

A total of fourteen studies were included in the narrative review. Of these eleven studies reported interventions focused on increasing staff knowledge or efficacy at reducing injury to patient and staff. A before and after study by Blair et al., (2017), described the effectiveness of a quality and safety intervention geared toward reducing restraint and seclusion (R/S) in a 120-bed psychiatric inpatient hospital in Hartford, Connecticut. The study examined R/S incidence and duration at baseline (October 2008-September 2009 n=3884) admissions, and all admissions a year after the intervention was fully implemented (October 2010-September 2012 n=8029) (Blair et al., 2017). The intervention consisted of an eight-hour class for staff with the focus on de-escalation techniques such as identifying patients centered for increased anger and agitation and the creation of comfort room with ambient lighting, music and sensory items (Blair et al., 2017). Descriptive statistics were used to identify the sample demographically and by frequency and duration of RS (Blair et al., 2017). An admission to the hospital served as the unit of measure (Blair et al., 2017). To compare R/S incidence Chi-square analysis was performed, and to compare R/S during the study versus baseline a t-test was performed (n=8029 vs. n=3884 hospitalizations) (Blair et al., 2017). The study period resulted in a statistically significant reduction in the rate of seclusive events 213/8029 = 4.4/100 admissions versus baseline 358/3884 = 9.2/100 admissions ($p<0.01$) equal to a 52% reduction (Blair et al., 2017). The rate of restraint events also decreased by 6% but was not found to be significant 213/3884 = 5.5/100 admissions versus that of the study period 412/8029 = 5.1/100 admissions (Blair et al., 2017). The results of this study were consistent with the findings from other studies that evaluated this same intervention.

A randomized controlled trial by Bowers et al., (2015), examined the efficacy of an intervention titled “Safewards” intervention for nursing staff, to decrease conflict and containment rates on acute psychiatric wards in London, UK. The study was comprised 31 psychiatric units randomized into 16 units in the experimental group and 15 units in the control group (Bowers et al., 2015). Wards in the experimental group implemented a package of 10 de-escalation interventions and the control group implemented interventions that focused on improving the physical health of staff (Bowers et al., 2015). The primary outcome of the study was the counts of conflict and containment on all shifts (day, evening, and night) obtained over the life of the study phases baseline, implementation and outcome (Bowers et al., 2015). There was no difference between ward type, gender exposed to intervention or control, or race between experimental and control groups (Bowers et al., 2015). The rate ratio estimates of treatment are presented with the 95% Bayesian credible interval and the p static (Bowers et al., 2015). The results, relative to control showed when conflicts happened, the Safewards intervention decreased the rate of conflicts by 15% (95% CI 5.6–23.7%) relative to control, and when events occurred that required containment, events were decreased by 26.4% (95% CI9.9-34.3%) relative to control (Bowers et al., 2015). The study demonstrated that intervention geared toward staff at improving relationships with patients can decrease the prevalence of conflict and containment (Bowers et al., 2015).

A retrospective analysis conducted by Bowers et al., (2006) explored the relationship between the implementation of a training course for acute psychiatric nursing staff and reported violent incident rates. The training course Prevention and Management of Violence and Aggression (PMVA) focused on alerting staff to factors that lead to aggression, signs of imminent violence, de-escalation techniques, manual restraint techniques, breakaway techniques and proper holds for restraining violent patients (Bowers et al., 2006). The study was conducted analyzing training records of 312 staff attendees and 684 violent incident rates over two-and -a-half years (April 2002-November 2004) on 14 acute psychiatric wards totaling 5,384 admission in three inner city hospitals in the United Kingdom (Bowers et al., 2006). The courses offered to staff consisted of either a five-day foundation course or a 1-day annual update course (Bowers et al., 2006). The five-day foundation course (N= 144 ward staff) included the de-escalation, prediction, anticipation, prevention of violence, response to aggression, communication, negotiation, problem solving, breakaway, manual restraint skills and organizational factors related to violence reduction, or a one-day course (Bowers et al., 2006). The 1-day update course (N=168) included only manual restraint skill (Bowers et al., 2006). Two times frames were used to collect data, 4-weeks and weeks (Bowers et al., 2006). The amount of occupied beds was used as the exposure variable (Bowers et al., 2006). The effect of incidents on training was determined by regressing the incident rates on the count of attendees at the PMVA courses over a period of time so that the number of physically aggressive incidents was related to the following month's staff attendees in the training course (Bowers et al., 2006). The frequency of aggressive incidents and staff attendance at a PMVA course was reported as a mean (M) and standard deviation (SD) (Bowers et al., 2006). Verbal aggression was reported as M=.16, SD=.51, property damage M=0.6, SD=.28, physical aggression M=.26, SD=.65 (Bowers et al., 2006). Increased physical aggression was seen with attendance to the PMVA update course at 3 weeks (IRR=1.17, p=.04) and 4 weeks (IRR=1.20, p=.019) as well as with attendance to the five-day course (IRR=1.50, p=<.001) during the same week (adjusted R^2=.012) (Bowers et al., 2006). Verbal aggression yielded and increase in attendance to the 5-day course (IRR=1.34, p=.042) and the update course in the same week (IRR=1.21, p=.038) in the same week (adjusted R^2=.005) (Bowers et al., 2006). This study's failure to find a decrease in violent incident rates, coupled with small increases in the number of incidents, questions efficacy of the intervention as a preventative strategy (Bowers et al., 2006).

A pre/post-test study by Calabro et al., 2002 analyzed the effectiveness of a training program for the prevention and management of patient violence at an acute care psychiatric hospital in the southwestern United States (Calabro et al., 2002). The study sought to increase staff knowledge and efficacy at defusing violent incidents and preventing assaults to patients and staff (Calabro et al., 2002). The study was conducted from August 1995 to December 1995 and there were 180 participants (N=180) who attended the mandatory training (Calabro et al., 2002). Training focused on methods that identify verbal and non-verbal behaviors that escalate to physical aggression and techniques that manage those behaviors (Calabro et al., 2002). Approximately 66% of training participants data was used in the analysis N=118 (Calabro et al., 2002). Participants data were excluded if they either missed the pre or post-test or did not properly code the test and as a result linking the data for paired data analysis was not possible (Calabro et al., 2002). The evaluation of the intervention was done measuring knowledge, attitude, self-efficacy, and behavioral intention (Calabro et al., 2002). Results were recorded as means standard deviation (SD) for time 1 (pre-test), and time 2 (post-test) and when compared, staff knowledge increased from 6.1 (1.6), 7.3 (1.7) p<0.001, staff attitude about using techniques revealed a

significant change 18.6 (4.7), 16.8 (4.5) $p<0.001$, improvement in self-efficacy was seen 5.0 (4.0), 14.3 (3.3) $p<0.01$, behavioral intention showed a modest improvement in staffs willingness to use techniques learned 10.8 (3.2), 10.3 (3.2) $p<0.05$ (Calabro et al., 2002). While implementing the intervention, reported injuries related to staff or patient assaults or staff being injured during restraining decreased to a historic <130 reported injuries annually (Calabro et al., 2002).

A prospective study by Shah and De, (1998), examined the effects of an educational intervention package for nurses working on a psychogeriatric unit in London, UK (Shah & De, 1998). The study was over an 18month period and broken into 6-week intervals (Shah & De, 1998). The first 6-week (phase 1) of the study focused on aggressive behavior at baseline, the second 6-week (phase 2) was the time the intervention was delivered to nursing staff and aggressive behavior was measured (Shah & De, 1998). The third 6-week (phase 3 examined the educational intervention on aggressive behavior in patents (Shah & De, 1998). The components of the educational package consisted of support for nursing staff, ability of nurses to vent feelings, and shared knowledge regarding aggression in the elderly population (Shah & De, 1998). Kruskal-Wallis one-way ANOVA was used to evaluate the overall significance between the study phases (Shah & De, 1998). The overall effect of the intervention on aggressive behavior was expressed as the mean, the standard deviation and range before the intervention 17.94 (14.68; 0-56), and after the intervention 11.53 (13.87; 0-55) (Shah & De, 1998). The results of this study indicated a significant decrease in aggressive behavior (Shah & De, 1998). The results may have been biased as the nursing staff was privy to the objective of the study, lack of randomization, and this was a pilot study done on one psychogeriatric unit in London (Shah & De, 1998).

A quasi experimental study by Laker et al., (2010) explored whether de-escalation and physical training can reduce incidents and the severity of incidents on a psychiatric intensive care unit in London, UK. The study was conducted from August 2005-August 2007 and allowed for the formation of two groups (Laker et al., 2010). The pre-intervention group was made up of all the incidents that happened 6-months prior to the intervention, and the post-intervention group included all the incidents after the intervention (Laker et al., 2010). An analysis of violent incidents on the unit revealed the rate of incidents post intervention was approximately 1% lower than pre-intervention and was not considered significant (Laker et al., 2010). The incident rate ration (IRR) = 0.986, 95% confidence interval (CI) = 0.75-1.29, P = 0.920 (Laker et al., 2010). The small reduction in violent incidents could have been related to the small sample size, N=196 participants and 266 violent incidents (Laker et al., 2010). Another thought regarding the small reduction in violent incidents was either de-escalation techniques where not improved by training, or the possibility that staff had difficulty implementing in practice (Laker et al., 2010).

A randomized control trial (RCT) by Needham et al., (2004), evaluated the effect of a training course for staff in aggression management on the severity and incidence of aggressive events, attacks against staff and patients, and coercive events. A total of six units were block randomized to intervention or control group and a pre and post design was used (Needham et al., 2004). The study was conducted in Switzerland and two of the inpatient psychiatric units were located in an urban setting and the other four units were located in rural settings (Needham et al., 2004). The goal of the course was to provide staff with the knowledge and capabilities to manage aggression through conflict management, communication and interaction, workplace safety, prevention of aggression and break away techniques which are physical skills taught to break out of a hold from an aggressive patient (Needham et al., 2004). Three months of baseline

data was collected for control and intervention groups, and four weeks without training for control group, and four weeks with training for intervention group (Needham et al., 2004). The first analysis of data calculated risk ratio and risk difference comparing intervention and control groups at baseline and during the intervention period independently (Needham et al., 2004). In the 6-month study period a total of 409 aggressive incidents were recorded, n=250 control, n=159 intervention group (Needham et al., 2004). During the baseline period wards in the treatment group recorded less incident of aggression (p = 0.05) and more coercive measures (p=0.05) indicating that randomization did not guarantee the even allocation of characteristics among groups (Needham et al., 2004). The incidence rate for aggressive incidents declined in the intervention group from baseline through intervention but did not reach statistical significance, the relative risk reduction (RRR = 19.3, 95% CI, 16%-44%) (Needham et al., 2004). Results reported in mean and SD showed the intervention group n =3 at baseline was 11.0 (5.2) and intervention 10.6 (4.6), and the control group n =3 at baseline was 7.5 (4.4) and intervention 10.0 (4.7) (Needham et al., 2004). There was no significant reduction in overall aggressive incidents (Needham et al., 2004). Despite randomization the overall incident rates of aggression and coercion differed between groups at baseline (Needham et al., 2004). In addition, a limitation found in the study that there may have been external factors which may have caused an increase in aggressive incidents in the control group (Needham et al., 2004).

A quasi-experimental study by Omolewa, (2012) examined the impact of an instructional education program for nurses at an acute psychiatric hospital in the Southern California. The aim of study was to measure knowledge, attitudes and practice of physical restraints of nurses on three behavioral health units and one acute care unit in an urban hospital (Omolewa, 2012). The study was carried out using an experimental group who received the physical restraint education session instructional program before the survey, and a control group who received the physical restraint education session after the survey (Omolewa, 2012). A purposive non-random sample method was used to assign nurses into experimental and control groups (Omolewa, 2012). Data was collected using a one-way-analysis-of-variance (ANOVA) and correlation test (Omolewa, 2012). In addition, independent t-test were done to support ANOVA (Omolewa, 2012). Knowledge of physical restraint use (KPRU) was assessed N = 128 and the mean = 11.58, SD = 2.10 and the Shapiro-Wilke test was significant p = <0.05 (Omolewa, 2012). Attitude of Physical restraint use (APRU) were assessed N =128 and the mean = 17.16, SD 7.54, Kolmogorov-Smirnov (K-S) tests were significant (p= 0.000) (Omolewa, 2012). Practices of physical restraint use (PPRU) were assessed N = 128, and the mean 39.48, SD 5.43, Kolmogorov-Smirnov (K-S) tests were significant (p= 0.000) (Omolewa, 2012).

The study revealed that as nurse's KPRU increases so does the scores on the scale (Omolewa, 2012). The mean scores of those in the experimental group were 13.63 with SD =0.58 (Omolewa, 2012). The mean scores of the control group were 6.67 with a SD = 0.51 on KPRU scale (Omolewa, 2012). The APRU revealed a significant difference in the means of nurse's who were exposed to the educational program (Omolewa, 2012). As nurse's attitude regarding restraint use increased, the scores for attitude decreased (Omolewa, 2012). The mean for the experimental group was 10.11 with SD = 3.13 on APRU scale, and the mean for the control group was 24.11 with SD = 3.39 on APRU scale (Omolewa, 2012). The lower the scores on this scale indicate better attitudes regarding physical restraints (Omolewa, 2012). In regard to practice of physical restraints (PPRU) the mean for the experimental group was 41.01 with SD = 4.39 and the mean for the control was 37.95 with a SD = 5.95 indicating more proficiency for the experimental group (Omolewa, 2012). This study demonstrated implementation of an

educational course on physical restraints and alternatives to their use could help to decrease the number of patients placed in restraints, foster better communication between staff and patients, and reduction in the rate of injury to staff and patients (Omolewa, 2012).

A before and after study by Parkes, (1996) used a repeated measures design that compared incidents of restraint 18-months prior to a restraint and control course to the incidents of restraint 12-months after the intervention. The study was conducted at a psychiatric hospital located in the United Kingdom (Parkes, 1996). Data was only collected if the incident involved physical restraints. The course involved no-touch training, break-away techniques and the use of three staff to restrain aggressive, assaultive and violent patients (Parkes, 1996). The overall effect of training was not significant as there were 51 injuries prior to training and 68 injuries after training (Parkes, 1996).

A before and after study conducted by Martin, (1995) examined the relationship between an aggression management program and staff injuries. The study was done at a University Hospital in Philadelphia, PA and staff were mandated to attend a aggression management workshop that included theory and practice, video on verbal de-escalation techniques, competence assessment with return demonstration of skill acquired within 2-months of workshop, and an annual certification in all three areas of the program (Martin, 1995). Data was collected 1-year prior to intervention and 2-years after (Martin, 1995). Aggressive incidents were reported based on level of aggression where level 2 is considered potential aggression, and level 3 is considered actual aggressive behavior (Martin, 1995). The results of the study indicated that in the year before the intervention 10/91-9/92 there were n=75 aggressive incidents that were either level 2 or 3 (Martin, 1995). In the two years after intervention there was an increase in aggressive incidents n=89 from 10/92-9/93, and n=119 10/93-9/94 (Martin, 1995). Although the overall number of incidents continued to increase the number of level 3 aggressive incidents appeared to decline (Martin, 1995). Conclusion of this study reported a decrease in aggressive incidents that require physical intervention, less staff injury, decreased missed time from work due to injury, and increased cost saving as a result of training in aggression management (Martin, 1995).

Patients education

A quasi-experimental study done by Park & Lee, (2012), examined the effectiveness of a short-term token economy (STTE) among males (n=44) with a history of aggression and violence on an inpatient psychiatric unit at a mental hospital in Dague, Korea. The men were separated by unit with n=22 in experimental group and n=22 in the control group (Park & Lee, 2012). The study took place from January 2008-April 2008 (Park & Lee, 2012). Researchers and staff discussed what kind of token would be given and what would be the reward (Park & Lee, 2012). The group decided giving stickers to patients for good behavior could be collected and used for a reward such as coffee, food choice, walk, outdoor activities, or to sleep late (Park & Lee, 2012). Results were recorded by team and behaviors before intervention and after at intervals were compared (Park & Lee, 2012). Statistical analysis was done by using the statistical package for social sciences (SPSS), and group differences were measured by using repeated measures ANOVA (Park & Lee, 2012). Group differences, in general characteristics of dependent variables between experimental and controls groups, were not significant (Park & Lee, 2012). The aggressive behavioral score for the experimental group at baseline was (M = 53.95), (SD = $\pm$ 3.12), and at 12-weeks (M = 41.90), (SD = $\pm$ 2.34) (Park & Lee, 2012). The aggressive behavioral score for the control group at baseline was (M = 54.04), (SD = $\pm$ 1.55),

and at 12-weeks (M = 56.22), (SD= ± 0.92) (Park & Lee, 2012). The results of the study concluded the experimental group saw a decrease in aggressive behavior, and the control group saw an increase in aggressive behavior indicating STTE is effective at decreasing the incidence of aggressive behavior on inpatient psychiatric units (Park & Lee, 2012).

A quasi-experimental study by Wilson, et al., (2011), described the implementation of a cognitive behavioral therapy (CBT) informed anger management intervention on a nine-bed psychiatric intensive care unit (PICU) in an inner-city hospital in the South of England. The intervention was implemented February 2007- April 2008 (Wilson, et al., 2011). The intervention included two sessions which focused on understanding anger and how to recognize it, communication, coping techniques, commitment, values and choices and was offered to n=12 male patients (Wilson, et al., 2011). Pre-intervention phase was considered 14-days before the start of the intervention (session one), and post-intervention phase was considered 14-days after the completion of the intervention (session two) (Wilson, et al., 2011). A Wilcoxon matched pairs signed rank test compared the frequency of violence and aggressive incidents yielded statistically significant decrease post-intervention (mean=2.8) compared to pre-intervention (mean=0.6); p=0.007 (Wilson, et al., 2011). The researchers could not be sure the results seen were totally due to the intervention or contributing factors such as participants taking medications as prescribed, low stimulus environment or general progression of well-being (Wilson, et al., 2011).

A before and after quasi-experimental study conducted by Lanza et al., (2009) tested the efficacy of a nurse led intervention for decreasing violence on an inpatient psychiatric unit at the Veteran's Hospital in Bedford, MA. The intervention titled "Violence prevention community meeting" (VPCM) focused on verbal and physical violence with the aim to change the culture of expectations and attitudes regarding violence against patients, staff and property (Lanza et al., 2009). The study took place over 20-weeks, from (January–May 2004) and consisted of 4-phases, pre-treatment phase 3-weeks and nurses recorded patient violence and delivered treatment as usual, transition phase 4-weeks nurses recorded patient violence and VPCM was introduced, treatment phase 9-weeks with VPMC being held twice/week and nurses recording violence, and post-treatment 4-weeks violence recorded and cessation of intervention (Lanza et al., 2009). A pair-wise comparison was done between pre-treatment and post-treatment (Lanza et al., 2009). Results of VPMC treatment showed an 41% reduction in violence from pre-treatment (mean = 4.79) (SD = 1.20), post-treatment (mean = 2.84), (SD = 1.15) (Lanza et al., 2009). The study demonstrated significant reduction of violence over the 20-weeks of study (Lanza et al., 2009). It was also noted that the participants that started during pre-treatment where different from those post-treatment indicating the efficacy of VPMC in the face of high patient turnover (Lanza et al., 2009).

A retrospective case analysis conducted by Lavell et al., (2016) explored the circumstances that lead to de-escalation use and its success at reducing conflict and containment. The study was completed in London, UK and included n = 522 adult psychiatric inpatients on 84 acute psychiatric wards and psychiatric intensive care units (PICU) in 31 randomly selected hospitals in the London and surrounding areas (Lavelle et al., 2016). A minimum of 3 patients from each unit were included and data was collected during the patients first 2-weeks of admission, any patients admitted less than 2-weeks were excluded (Lavelle et al., 2016). The study was conducted from July 2009 – March 2010 (Lavelle et al., 2016). Over half (53%) the sample n = 522 experienced de-escalation during the first 2-weeks of admission and 37% experiencing de-escalation at least twice (Lavelle et al., 2016). The study reported 784 incidents and 61% (n =

476) were considered successful with de-escalation ending conflict, and 35% (n = 276) unsuccessful were de-escalation lead to conflict and containment (Lavelle et al., 2016). Successful de-escalation had fewer precursors such as aggression, violence, physical violence and twice as likely to have no precursor events prior to de-escalation (M = 0.91) (SD = 1.05), compared to un-successful de-escalation (M = 1.39) (SD = 1.46), (OR = 2.19, 95% CI = 1.55 – 3. 11, $p<0.01$) (Lavelle et al., 2016). The findings of this study revealed the over half of the participants experienced de-escalation within the first 2-weeks of admission, and over 1/3 of those experienced multiple episodes of de-escalation and, when implemented de-escalation was successful at ending the sequelae of events that lead to conflict and containment (Lavelle et al., 2016).

Discussion

This current review sought to compare the effectiveness of de-escalation techniques to restraint and seclusion on inpatient psychiatric units. The review demonstrated de-escalation techniques come in many interventions and there is not one single approved definition for de-escalation. De-escalation appears to be an umbrella term used for most interventions that decrease escalating aggression and violence. The varied studies included in this review identified several types of de-escalation techniques and represent a small sample of all the different techniques marketed to institutions. The de-escalation techniques were delivered to staff and patients. As a result, the majority of studies in this review focused on techniques that decrease aggression and violent behavior and the efficacy of the interventions.

This systematic review of the current literature revealed no head to head comparison studies for de-escalation and restraint/seclusion. The current body of evidence lacks RCT's that examines the efficacy of R/S and de-escalation techniques aimed at decreasing aggression, violence and injury to staff and patients. In addition, there is not an overall consensus for efficacy of interventions that would help to inform practice and guide institutions seeking best practices. The current literature lacks consensus for defining de-escalation. As a result, this study included all studies that examined interventions aimed at decreasing aggression, violence and injury to staff and patients.

An increasing acuity in patients has been identified by mental health staff and is thought to contribute to the increase in the aggression, violence and injury seen on inpatient psychiatric units. As a result of the deficiency in studies that focus on direct comparison of de-escalation and R/S, the inclusion criteria for de-escalation techniques in this systematic review was broadened to include any non-R/S intervention that aimed to decreased aggression, violence and injury to staff and patients.

Caution should be exercised when thinking of interventions to implement on inpatient psychiatric units to curtail increased aggression and violence. Many of the studies included interventions that were effective at decreasing injury to staff and patients. Many of the studies included interventions that were not effective at decreasing injury and some even saw an increase in injury after the intervention. The inconsistency seen between studies may not necessarily be due to chance.

The challenge for many institutions is the possibility of fines levied by from regulating agencies such as Medicare/Medicaid, Joint Commission on Accreditation of Health Care Organizations (JCAHO), and the Occupational Safety and Health Administration (OSHA) that state institutions must implement workplace violence initiatives that reduce injury to staff and

patients. To that end, programs are aggressively marketed to institutions that may lack best evidence-based practices. There appears to be a lack in oversight to monitor programs developed for de-escalation. In addition, many programs lack rigorous trials that yield reliable results and may lead to increase in violence and injuries. A bill has recently been introduced to Congress that would mandate OSHA to develop a national standard for healthcare and social service employers to implement a comprehensive workplace violence prevention plan but it has not yet been voted into legislation (Nurses Applaud Introduction of Federal Legislation to Prevent Workplace Violence in Health Care, Social Service Settings, 2019).

This review revealed de-escalation and or R/S training was effective in approximately half of the studies where the intervention was offered to staff. The finding for interventions given to staff had variable results compared to the studies in which the intervention was offered to patients. All of the studies included in the review that offered interventions for aggression/violence management to patients revealed significant findings. The studies included that taught de-escalation techniques to patients saw a decrease in aggression, violence and injury. There may be several contributing factors associated with this finding. De-escalation has been identified to be most effective when aggressive behavior first begins to escalate. Staff have reported not being confident in their ability to deliver the intervention at the moment it is probably to be most effective. The reasons given by staff for inability to deliver the intervention have been reported as fear, past trauma, past injury, history of physical attack, and lack of knowledge. The reasons given for staff's inability to deliver the intervention a presents a challenge in the delivery of an intervention that could potentially diffuse a situation that would lead to property destruction, injury or death.

There is increasing consensus among clinicians in practice and professional organizations that R/S should be used as a last option for aggressive and violent behavior (Lewis, Taylor, & Parks, 2009). The lack of studies comparing R/S and de-escalation directly makes determination of effectiveness challenging. Nevertheless, there is an increased urgency to implement de-escalation techniques and workplace violence initiatives in psychiatric institutions (Nurses Applaud Introduction of Federal Legislation to Prevent Workplace Violence in Health Care, Social Service Settings, 2019). Expediency to implement interventions appears to be the result of increased physical, emotional and psychological injury, court cases filed by staff, patients and family as well as accidental death as a result of R/S (Lewis, Taylor, & Parks, 2009).

Psychological injury although prevalent is not represented in the literature. Among the studies included in this review only one mentioned the psychological toll aggression and violence have on patients and staff on inpatient psychiatric units. The under-representation of this form of injury does little to increase awareness to the psychological trauma experienced by patients and staff. The lack of representation in the literature regarding psychological trauma is alarming. Psychological trauma affects patient or staff's ability to feel safe and secure and can jeopardize the effectiveness of interventions for aggression and violence. It has been mentioned in several included studies that as a result of prior exposure to aggression and violence, staff on inpatient psychiatric units are fearful for their safety. Feeling unsafe has been seen as a contributing factor to why de-escalation techniques are either employed by staff at the wrong time, or don't work in the moment to diminish escalating aggression.

A total of ten studies found de-escalation techniques decreased aggression and violence, while four studies found de-escalation did not decrease aggression and violence or aggression and violence increased as a result of the intervention. De-escalation techniques taught to psychiatric mental health workers were the most common way this intervention was delivered in the

majority of studies. Despite the number of studies included in this review, heterogeneity between studies did not permit meta-analysis. Eleven of the fourteen studies included in the review reported results of de-escalation effectiveness delivered to staff. The evidence provided in the studies showed mixed results. Of the studies delivered to staff, seven of the eleven showed a significant reduction of aggressive, violent behavior and/or, a decrease in restraint and seclusion use. The studies that showed a significant reduction in aggression/violence indicated that de-escalation is a viable intervention at decreasing aggression and violence. It was also noted that psychiatry is a very dynamic specialty and not everything works for everybody. Approximately half of the studies aimed at staff that taught a de-escalation and or R/S reduction course demonstrated positive results regarding decreased injuries to staff and patients. The explanation regarding success in these studies varied. However, it is suggested that short term improvements in confidence, knowledge, and efficacy allows staff to feel more comfortable in implementing techniques to reduce aggression and violence in the moment. In addition, when staff are better at assessing for impending aggression and violence and are more comfortable intervening, there appears to be better outcomes and environmental safety. The studies that taught interventions to staff reported less injuries, less fear in implementing interventions, less missed time at work, and increased saving to the institutions.

This study revealed there were more injuries to staff and patients seen in approximately half of the studies that implemented de-escalation or R/S intervention to staff. One possible explanation for the lack of effectiveness of de-escalation techniques taught to staff at reducing injuries to staff and patients may be the inadequate staffing of psychiatric units, which makes it difficult to successfully monitor and attend to violent and aggressive incidents (Sentinel Event Alert, 2018).

Interventions for R/S use seem to yield more injury to staff and patients. The increase in injury to staff and patients brings to light the higher acuity of patients that do not respond to de-escalation and the increase and severity of aggression and violence in real time (Sentinel Event Alert, 2018).

The effects of the interventions taught to patients yielded more positive results. When de-escalation techniques are implemented as aggression begins to escalate it appears to be most effective (Lavelle et al., 2016). All four studies included in this review that implemented interventions toward patients saw significant decreases in violent and aggressive incidents. It was noted across studies that interventions delivered to patients help to foster therapeutic relationships and increase confidence and trust between staff and patients. Building the therapeutic relationship while implementing interventions for patients on decreasing aggression and violence appears to lead to better outcomes regarding injuries to staff and patients (Park & Lee, 2012). Tailoring interventions to patients and keeping sessions targeted and short appeared most effective (Park & Lee, 2012). In order to sustain the results seen in the interventions geared toward patients, it is suggested that a strong administrative, familial and therapeutic staff support is necessary (Park & Lee, 2012).

Among studies where the de-escalation intervention targeted patients, it appears that the effectiveness of the interventions may be predicated on the be predicated on the belief that aggression/violence expectation and acceptance in the culture needs to change to one that focuses on non-violence as part of the culture (Lanza et al., 2009). Community values should be regularly affirmed by the members (Lanza et al., 2009). Unsuccessful de-escalation was more common in patients with a history of aggression and violence (Lanza et al., 2009).

This current review demonstrated that although the majority of interventions aimed at decreasing aggression and violence on inpatient psychiatric units are taught to staff there is discrepancy regarding effectiveness across studies. This review identified de-escalation techniques implemented to patients fostered therapeutic relationships and had positive outcomes at decreasing aggression and violence. In addition, lack of oversight and de-escalation techniques backed by evidence by regulating agencies has contributed to the discrepancy seen in the effectiveness of interventions at decreasing aggression, violence and injury to staff and patients across studies. This review aims to foster discussion regarding development and implementation of evidence-based interventions for aggression and violence geared toward staff and patients in an effort to maximize efficacy at reducing injury to staff and patients. The knowledge gained will guide practitioners, administrators and legislators toward developing and establishing guidelines for interventions that with promote safety and allow for best outcomes for patients and staff.

Limitations of the review

This review contained several limitations. The search strategy used in this review was restricted to the English language. All articles published in other languages were excluded, and evidence from studies in other languages may have been omitted. The search of PubMED and CINAHL databases was conducted using MESH terms and indexing terms, and it is possible that some significant studies were missed. In addition, heterogeneity between the studys' outcomes measures limited the chance of conducting a meta-analysis regarding the effect of de-escalation on the rates of injury to patients and staff.

Most of the studies were conducted in the UK which may have limited the generalizability of the review findings. In addition, most studies were limited to one hospital. A comprehensive search did not identify any studies that directly compared efficacy of de-escalation versus R/S at decreasing injury. Efficacy of de-escalation interventions had to be evaluated independent of the restraint and seclusion comparator.

This review included studies that contained some methodological failings such as unreported data, errors in reporting data, lack of comparison groups, and there was a sparsity of RCT. In addition, many studies lacked statistical significance or contained small sample sizes. Finally, the definition of what constitutes a de-escalation technique varies greatly as seen in the different studies making it difficult to interpret and compare findings.

Conclusion

Comprehensive examination of the available evidence revealed that effectiveness of de-escalation is highly variable and as the on-going and systematic implementation of these interventions in clinical practice jeopardizes patient and staff safety. Lack of oversight into evidence-based interventions for least restrictive measures for aggression and violence management has spawned many techniques that lack reliability and best practice backed by evidence. More research is needed that compares the effectiveness of de-escalation to restraint and seclusion at decreasing injury in inpatient psychiatric settings.

Implications for practice

There is a JBI level 1C of evidence on Safewards interventions for improving staff relationships and reducing frequency of conflict and containment among psychiatric patients.

There is a JBI level 1C of evidence on effectiveness of a training course in aggression management in severe aggression and coercion rates among psychiatric patients although results did not reach statistical significance.

There is a JBI level 2C of evidence on crisis intervention, trauma informed care and environmental enhancements at decreasing restraint and seclusion among psychiatric patients.

There is a JBI level 2D of evidence exploring the relationship between training in prevention and management of violence and aggression among psychiatric nursing staff and violence incidence rates.

There is a JBI level 2D of evidence on the effectiveness of non-violent crisis intervention techniques at increasing staff knowledge, attitude, self-efficacy and behavioral intention in managing violence among psychiatric patients.

There is a JBI level 2D of evidence on effectiveness of de-escalation and physical intervention training for managing violence, incident reduction and incident severity. There is a lack in consistency across studies.

There is a JBI level 2D of evidence on violence prevention community meeting for reducing patient violence taught to psychiatric patients.

There is a JBI level 2D of evidence on predictors of effective de-escalation among psychiatric patients. De-escalation was successful in 60% of patients that where aggressive.

There is JBI level 2D of evidence on the effectiveness of aggression management workshops. There was an increase in aggressive incidents among psychiatric patients. There is a lack in consistency across studies.

There is a JBI level 2D of evidence on effectiveness of a physical restraint education session at improving knowledge, attitudes, practice among staff on psychiatric units.

There is a JBI level 2D of evidence on effectiveness of short-term token economy for psychiatric patients.

There is a JBI level 2D of evidence of on training in restraint and seclusion. There was an increase in staff injuries and aggressive incidents. There is a lack in consistency across studies.

There is a JBI level 2C of evidence on effectiveness of an educational package for nursing staff for reducing aggressive behavior on psychogeriatic units.

There is a JBI level 2D of evidence on effectiveness of a CBT-informed anger management intervention for psychiatric patients.

Implications for research

Although the majority of studies included in this review examined the effectiveness of de-escalation techniques taught to staff and patients, there is still a significant need for further research in this area.

The review highlighted that de-escalation is an umbrella term that encompasses many different techniques used to diffuse aggression and violence on inpatient psychiatric units. It will require more research to identify if de-escalation techniques are more effective at reducing injury than R/S. There is a need for well-designed RCTs, or quasi-experimental studies that compare these interventions preferably with randomization to experimental and control groups, extended follow-up, reasonable sample size, objective methods for collecting data, and similar outcome measures that address effectiveness of interventions on inpatient psychiatric units.

Although there are many techniques that can qualify as de-escalation based on current understanding of the term, the ambiguity lends to techniques that may or may not work in consequential circumstances. Given the level of acuity in the environment in which these techniques are used, there has to be better oversight given to the techniques and the recommendation for use that are backed by clinical trials that yield the best practices. At this time in most psychiatric institutions any situation can be considered life threatening and additional research should be conducted with the same urgency.

Evidence translation

The results of this review will be disseminated at Nursing Ground rounds at an urban Medical Center in New Jersey on November 26, 2019. Nursing Grand Rounds are presentations given by nurses who share evidence-based information that focuses on health maintenance, promotion and research and best practice. Providing nursing education and communication in presentation format aides in propelling the profession forward and keeping in pace with the latest evidence-based treatment modalities in hopes of better patient outcomes.

The evidence obtained in this review will be presented in a planned power point presentation. Approval for this presentation has been granted through the Nursing Education Department in adherence with American Nursing Credentialing Center (ANCC), and New Jersey State Nurses Association (NJSNA) and Accreditation Council for Continuing Medical Education (ACCME) criteria. In addition, an application for 1 CEU/CME has been obtained and will be submitted through the Medical Center educational activities, ANCC, and ACCME.

Marketing to medical professionals and paraprofessionals including nurses, doctors, residents, administrators, executive staff, social workers, mental health aides and any others interested has been accomplished through posters, email, and offered as a course for continuing education in the Medical Center's staff Net Learning.

Conflicts of interest

None to disclose.

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APPENDIX I: Search strategy

PubMed	**Results**
(de-escalation OR deescalation OR "Staff Development"[Mesh] OR staff training OR talk therapy OR therapeutic communication OR aggression management OR aggression minimisation OR aggression minimization OR "Inservice Training"[Mesh] OR “Behavior Control”[Mesh] OR behavior control OR "Restraint, Physical"[Mesh] OR mechanical restraint OR physical restraint OR sedation OR "Social Isolation"[Mesh OR seclusion) AND ("Hospitals, Psychiatric"[Mesh] OR "Psychiatric Department, Hospital"[Mesh] OR "Psychiatry"[Mesh] OR "Psychiatric Nursing"[Mesh] OR psychiatric OR psychiatry OR "Mental Disorders"[Mesh] OR mental disorders OR mentally ill OR mental illness OR mental health setting) AND (assault OR "Physical Abuse"[Mesh] OR "Violence"[Mesh] OR psychological trauma OR injuries OR aggression OR aggressive OR violence) AND ("Comparative Effectiveness Research"[Mesh] OR effectiveness OR efficacy) Filters activated: English, Adult: 19-44 years, Middle Aged: 45-64 years, Aged: 65+ years.	937
Scopus (Advanced search) TITLE-ABS-KEY (de-escalation OR deescalation OR "staff training" OR "talk therapy" OR "therapeutic communication" OR "aggression management" OR "aggression minimisation" OR "aggression minimization" OR "behavior control" OR "inservice training" OR "mechanical restraint" OR "physical restraint" OR sedation OR isolation OR seclusion) AND TITLE-ABS-KEY (psychiatric OR psychiatry OR "mental disorders" OR "mentally ill" OR "mental illness" OR "mental health setting") AND TITLE-ABS-KEY (assault OR "Physical Abuse" OR Violence OR "psychological trauma" OR injuries OR aggression OR aggressive) AND TITLE-ABS-KEY (effectiveness OR efficacy) AND TITLE-ABS-KEY (adult OR adults) Limit of English language	198

CINAHL (MH "Staff Development" OR MH "Restraint, Physical" OR MH "Social Isolation" OR de-escalation OR deescalation OR "staff training" OR "talk therapy" OR "therapeutic communication" OR "aggression management" OR "aggression minimisation" OR "aggression minimization" OR "behavior control" OR "inservice training" OR "mechanical restraint" OR "physical restraint" OR sedation OR isolation OR seclusion) AND ((MH "Psychiatry") OR (MH "Psychiatric Units") OR (MH "Psychiatric Patients") OR psychiatric OR psychiatry OR "mental disorders" OR "mentally ill" OR "mental illness" OR "mental health setting") AND ((MH "Verbal Abuse") OR assault OR "Physical Abuse" OR Violence OR (MH "Violence") OR "psychological trauma" OR injuries OR aggression OR aggressive) AND (effectiveness OR efficacy) Limit of English language and all adults	20
Web of Science (de-escalation OR deescalation OR "staff training" OR "talk therapy" OR "therapeutic communication" OR "aggression management" OR "aggression minimisation" OR "aggression minimization" OR "behavior control" OR "inservice training" OR "mechanical restraint" OR "physical restraint" OR sedation OR isolation OR seclusion) AND (psychiatric OR psychiatry OR "mental disorders" OR "mentally ill" OR "mental illness" OR "mental health setting") AND (assault OR "Physical Abuse" OR Violence OR "psychological trauma" OR injuries OR aggression OR aggressive) AND (effectiveness OR efficacy) AND (adult OR adults) Limit of English Language	21

PsycINFO 1 exp Personnel Training/ (15885) 2 exp Anger Control/ (989) 3 exp Physical Restraint/ (2020) 4 exp PATIENT SECLUSION/ (487) 5 (de-escalation or deescalation or "staff training" or "talk therapy" or "therapeutic communication" or "aggression management" or "aggression minimisation" or "aggression minimization" or "behavior control" or "inservice training" or "mechanical restraint" or "physical restraint" or sedation or isolation or seclusion).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] (43810) 6 1 or 2 or 3 or 4 or 5 (58661) 7 exp PSYCHIATRY/ (48119) 8 exp Mental Disorders/ (565000) 9 (psychiatric or psychiatry or "mental disorders" or "mentally ill" or "mental illness" or "mental health setting").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] (341271) 10 7 or 8 or 9 (735270) 11 exp Injuries/ (24819) 12 exp VIOLENCE/ (71535) 13 exp Emotional Trauma/ (14933) 14 exp Aggressive Behavior/ (148319) 15 (assault or "Physical Abuse" or Violence or "psychological trauma" or injuries or aggression or aggressive).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] (189833) 16 11 or 12 or 13 or 14 or 15 (261423) 17 exp TREATMENT EFFECTIVENESS EVALUATION/ (22868) 18 (EFFECTIVENESS or EFFICACY).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] (286733) 19 17 or 18 (287125) 20 limit 19 to "300 adulthood <age 18 yrs and older>" (141273) 21 6 and 10 and 16 and 19 and 20 (94)	94
Academic Search Premiere (de-escalation OR deescalation OR "staff training" OR "talk therapy" OR "therapeutic communication" OR "aggression management" OR "aggression minimisation" OR "aggression minimization" OR "behavior control" OR "inservice training" OR "mechanical restraint" OR "physical restraint" OR sedation OR isolation OR seclusion) AND (psychiatric OR psychiatry OR "mental disorders" OR "mentally ill" OR "mental illness" OR "mental health setting") AND (assault OR "Physical Abuse" OR Violence OR "psychological trauma" OR injuries OR aggression OR aggressive) AND (effectiveness OR efficacy) AND (adult OR adults)	27

Cochrane library of Systematic Reviews (de-escalation OR deescalation OR "staff training" OR "talk therapy" OR "therapeutic communication" OR "aggression management" OR "aggression minimisation" OR "aggression minimization" OR "behavior control" OR "inservice training" OR "mechanical restraint" OR "physical restraint" OR sedation OR isolation OR seclusion) AND (psychiatric OR psychiatry OR "mental disorders" OR "mentally ill" OR "mental illness" OR "mental health setting") AND (assault OR "Physical Abuse" OR Violence OR "psychological trauma" OR injuries OR aggression OR aggressive) AND (effectiveness OR efficacy) AND (adult OR adults)	0

APPENDIX II

JBI Critical Appraisal Checklist for Randomized Controlled Trials

Reviewer_____ _____ _____ _____ _____ _____ _____Date_____ _____ _____ _____ _____ _____ _____.

Author _____ _____ _____ _____ _____ _____ _____Year_____ _____ _____Record Number_____.

		Yes	No	Unclear	NA
1.	Was true randomization used for assignment of participants to treatment groups?	☐	☐	☐	☐
2.	Was allocation to treatment groups concealed?	☐	☐	☐	☐
3.	Were treatment groups similar at the baseline?	☐	☐	☐	☐
4.	Were participants blind to treatment assignment?	☐	☐	☐	☐
5.	Were those delivering treatment blind to treatment assignment?	☐	☐	☐	☐
6.	Were outcomes assessors blind to treatment assignment?	☐	☐	☐	☐
7.	Were treatment groups treated identically other than the intervention of interest?	☐	☐	☐	☐
8.	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	☐	☐	☐	☐
9.	Were participants analyzed in the groups to which they were randomized?	☐	☐	☐	☐
10.	Were outcomes measured in the same way for treatment groups?	☐	☐	☐	☐
11.	Were outcomes measured in a reliable way?	☐	☐	☐	☐
12.	Was appropriate statistical analysis used?	☐	☐	☐	☐
13.	Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

_____

JBI Critical Appraisal Checklist for Quasi-Experimental Studies (non-randomized experimental studies)

Reviewer_____Date_____

Author _____Year_____Record Number_____

		Yes	No	Unclear	Not applicable
1.	Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	☐	☐	☐	☐
2.	Were the participants included in any comparisons similar?	☐	☐	☐	☐
3.	Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	☐	☐	☐	☐
4.	Was there a control group?	☐	☐	☐	☐
5.	Were there multiple measurements of the outcome both pre and post the intervention/exposure?	☐	☐	☐	☐
6.	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	☐	☐	☐	☐
7.	Were the outcomes of participants included in any comparisons measured in the same way?	☐	☐	☐	☐
8.	Were outcomes measured in a reliable way?	☐	☐	☐	☐
9.	Was appropriate statistical analysis used?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

_____

JBI Critical Appraisal Checklist for Case Control Studies

Reviewer_____Date_____

Author _____Year_____Record Number_____

	Yes	No	Unclear	Not applicable
1. Were the groups comparable other than the presence of disease in cases or the absence of disease in controls?	☐	☐	☐	☐
2. Were cases and controls matched appropriately?	☐	☐	☐	☐
3. Were the same criteria used for identification of cases and controls?	☐	☐	☐	☐
4. Was exposure measured in a standard, valid and reliable way?	☐	☐	☐	☐
5. Was exposure measured in the same way for cases and controls?	☐	☐	☐	☐
6. Were confounding factors identified?	☐	☐	☐	☐
7. Were strategies to deal with confounding factors stated?	☐	☐	☐	☐
8. Were outcomes assessed in a standard, valid and reliable way for cases and controls?	☐	☐	☐	☐
9. Was the exposure period of interest long enough to be meaningful?	☐	☐	☐	☐
10. Was appropriate statistical analysis used?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

_____

JBI Data Extraction Form for Experimental / Observational Studies

Reviewer _____ Date _____

Author _____ Year _____

Journal _____ Record Number _____

Study Method

RCT	☐	Quasi-RCT	☐	Longitudinal	☐
Retrospective	☐	Observational	☐	Other	☐

Participants

Setting

Population

Sample size

Group A _____ Group B _____

Interventions

Intervention A

Intervention B

Authors Conclusions:

Reviewers Conclusions:

Appendix III: Data extraction instruments

MAStARI data extraction instrument

JBI Data Extraction Form for Experimental / Observational Studies

Reviewer _____ Date _____

Author _____ Year _____

Journal _____ Record Number _____

Study Method

RCT ☐ Quasi-RCT ☐ Longitudinal ☐

Retrospective ☐ Observational ☐ Other ☐

Participants

Setting _____

Population _____

Sample size

Group A _____ Group B _____

Interventions

Intervention A _____

_____

Intervention B _____

_____

Authors Conclusions:

_____

_____

_____

Reviewers Conclusions:

_____

_____

_____

Appendix IV: Critical appraisal of included studies

Blair *et al.*

Criteria	Yes/no/ unclear	Comments
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	N/A	No comparison groups
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	N/A	No comparison groups
4. Was there a control group?	No	No control groups
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	N/A	No comparison groups
7. Were the outcomes of participants included in any comparisons measured the same way?	N/A	No comparison groups
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Bowers *et al.* (2015)

Criteria	Yes/no/ unclear	Comments
1. Was true randomization used for assignment of participants to treatment groups?	Yes	
2. Was allocation to treatment groups concealed?	Yes	
3. Were treatment groups similar at baseline?	Yes	
4. Were the participants blind to treatment assignment?	Yes	
5. Were those delivering treatment blind to treatment assignment?	Yes	
6. Were outcomes assessors blind to treatment assignment?	Yes	
7. Were treatment groups treated identically other than the intervention of interest?	Yes	
8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
9. Were participants analysed in the groups to which they were randomized?	Yes	
10. Were outcomes measured in the same way for treatment groups?	Yes	
11. Were outcomes measured in a reliable way?	Yes	
12. Was appropriate statistical analysis used?	Yes	
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Yes	
		Include

Bowers *et al*. (2006)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Unclear	Not clear
4. Was there a control group?	Yes	
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	No	Follow up was not complete, and not mentioned
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Bybel, 2011

Criteria	**Yes/no/ unclear**	**Comments**
1. Were the criteria for inclusion in the sample clearly defined?	Yes	
2. Were the study subjects and the setting described in detail?	Yes	
3. Was the exposure measured in a valid and reliable way?	Yes	
4. Were objective, standard criteria used for measurement of the condition?	Yes	
5. Were confounding factors identified?	Yes	
6. Were strategies to deal with confounding factors stated?	No	
7. Were the outcomes measured in a valid and reliable way?	Yes	
8. Was appropriate statistical analysis used?	Yes	
		Include Correlation study included because it provided new knowledge and understanding of the relationships between education provided to direct care staff and the rates of R/S that affect quality of care.

Calabro *et al. (2002)*

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	N/A	No comparison groups
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	N/A	No comparison groups
4. Was there a control group?	No	No comparison groups
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	N/A	No comparison groups
8. Were outcomes measured in a reliable way?	Unclear	No mention of reliability
9. Was appropriate statistical analysis used?	Yes	

		Include

Needham *et al., (2004)*

Criteria	**Yes/no/ unclear**	**Comments**
1. Was true randomization used for assignment of participants to treatment groups?	Yes	
2. Was allocation to treatment groups concealed?	Unclear	Concealment of allocation to groups was not mentioned and cannot be inferred.
3. Were treatment groups similar at baseline?	Yes	
4. Were the participants blind to treatment assignment?	Yes	
5. Were those delivering treatment blind to treatment assignment?	No	Due to the nature of the intervention blinding of staff was impossible
6. Were outcomes assessors blind to treatment assignment?	Yes	
7. Were treatment groups treated identically other than the intervention of interest?	Yes	
8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
9. Were participants analysed in the groups to which they were randomized?	Yes	
10. Were outcomes measured in the same way for treatment groups?	Yes	
11. Were outcomes measured in a reliable way?	Yes	
12. Was appropriate statistical analysis used?	Yes	
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Yes	
		Include

Laker *et al.,* (2010)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	Pre and Post training groups included
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Lanza *et al.,* (2009)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	

3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	No	No mention of reliability
9. Was appropriate statistical analysis used?	Yes	
		Include

Lavelle et al., (2016)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	No control groups
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Martin, (1995)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	No control groups
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	No	Information regarding follow up not provided, unable to contact author for additional information
7. Were the outcomes of participants included in any comparisons measured the same way?	Unclear	Not enough information provided
8. Were outcomes measured in a reliable way?	No	
9. Was appropriate statistical analysis used?	No	
		Include

Omolewa, (2012)

Criteria	Yes/no/ unclear	Comments
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	Yes	
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Park et al., (2012)

Criteria	Yes/no/ unclear	Comments
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	Yes	
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	No	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Parkes, (1996)

Criteria	Yes/no/ unclear	Comments
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	No	Reliability within study no mentioned.
9. Was appropriate statistical analysis used?	Yes	
		Include

Shah et al., (1998)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	No control group
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	Yes	
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	Yes	
9. Was appropriate statistical analysis used?	Yes	
		Include

Wilson et al., (2018)

Criteria	**Yes/no/ unclear**	**Comments**
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Yes	
2. Were the participants included in any comparisons similar?	Yes	
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes	
4. Was there a control group?	No	No control group
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?	No	No mention of follow up
7. Were the outcomes of participants included in any comparisons measured the same way?	Yes	
8. Were outcomes measured in a reliable way?	No	Reliability not mentioned. Author did not respond for further information.
9. Was appropriate statistical analysis used?	Yes	
		Include

Appendix V: List of excluded studies and reasons for their exclusion

Excluded studies

1. Becker, M., Love, C. C., & Hunter, M. E. (1997). Intractability is relative: Behaviour therapy in the elimination of violence in psychotic forensic patients. *Legal and Criminological Psychology*, *2*(1), 89–101. doi: 10.1111/j.2044-8333.1997.tb00335.x
Reason for exclusion: design, low methodological quality, small sample. Lot of missing data., reached out to author, no response.

2. Binil, V., Sudhakar, C., & Hegde, S. (2017). Effect of Aggression Management and Violence Prevention Training Program among Nurses Working in Psychiatric and Emergency Setting-A Mixed Method Protocol. *Indian Journal of Public Health Research & Development*, *8*(4), 58. doi: 10.5958/0976-5506.2017.00314.x
Reason for exclusion: Setting included Emergency Department, follow up not complete, appropriate statistical analysis not mentioned, it's a protocol, and results have not been published to date.

3. Bowers, L., Werf, B. V. D., Vokkolainen, A., Muir-Cochrane, E., Allan, T., & Alexander, J. (2007). International variation in containment measures for disturbed psychiatric inpatients: A comparative questionnaire survey. *International Journal of Nursing Studies*, *44*(3), 357–364. doi: 10.1016/j.ijnurstu.2006.01.005
Reasons for exclusion: population (student nurses), Medication use as means of controlling behavior.

4. Davies, B., Griffiths, J., John-Evans, H., Lowe, K., Howey, S., & Artt, A. (2016). Changes in staff confidence and attributions for challenging behaviour after training in positive behavioural support, within a forensic mental health setting: a replication study with follow-up. *The Journal of Forensic Psychiatry & Psychology*, *27*(6), 886–906. doi: 10.1080/14789949.2016.1222448
Reasons for exclusion: setting (forensic unit)

5. Lebel, J. L., Duxbury, J. A., Putkonen, A., Sprague, T., Rae, C., & Sharpe, J. (2014). Multinational Experiences in Reducing and Preventing the Use of Restraint and Seclusion. *Journal of Psychosocial Nursing and Mental Health Services*, *52*(11), 22–29. doi: 10.3928/02793695-20140915-01
Reasons for exclusion: Multiple study designs for different countries, missing data, lack of follow-up, no sample size mentioned, reached out to author, no response.

6. Martin, T., & Daffern, M. (2006). Clinician perceptions of personal safety and confidence to manage inpatient aggression in a forensic psychiatric setting. *Journal of Psychiatric and Mental Health Nursing*, *13*(1), 90–99. doi: 10.1111/j.1365-2850.2006.00920.x
Reasons for exclusion: Qualitative study

7. Mclaughlin, S., Bonner, G., Mboche, C., & Fairlie, T. (2010). A pilot study to test an intervention for dealing with verbal aggression. *British Journal of Nursing*, *19*(8), 489–494. doi: 10.12968/bjon.2010.19.8.47638
Reasons for exclusion: Pilot study, small sample, unreliable screening tool, no data reported, outcomes not measured, statistical analysis not completed, low methodological quality.

8. Omérov, M., & Wistedt, B. (1997). Mangageable violence in a new ward for acutely admitted patients. *European Psychiatry*, *12*(6), 311–315. doi: 10.1016/s0924-9338(97)84792-x
Reasons for exclusion: Low methodological quality, outcomes measured in a reliable way, statistical analysis unclear, reached out to author no response.

9. Jonker, E. J., Goossens, P. J. J., Steenhuis, I. H. M., & Oud, N. E. (2008). Patient aggression in clinical psychiatry: perceptions of mental health nurses. *Journal of Psychiatric and Mental Health Nursing*, *15*(6), 492–499. doi: 10.1111/j.1365-2850.2008.01261.x
Reasons for exclusion: Mixed adult and children, not enough information, reached out to author 2/20/19, no response.

10. Needham, I., Abderhalden, C., Halfens, R., Dassen, T., Haug, H., & Fischer, J. (2005). The effect of a training course in aggression management on mental health nurses' perceptions of aggression: a cluster randomised controlled trial. *International Journal of Nursing Studies*, *42*(6), 649–655. doi: 10.1016/j.ijnurstu.2004.10.003
Reasons for exclusion: after further evaluation this study was excluded because it was designed to test the efficacy of a training program on aggression management to influence nurses' perception of and attitude on patient aggression, missing criteria for inclusion, aim of the study did not fit.

11. Goetz et al., 2012 Goetz, S. B., & Taylor-Trujillo, A. (2012). A Change in Culture. *Journal of the American Psychiatric Nurses Association*, *18*(2), 96–103. doi: 10.1177/1078390312439469
Reasons for exclusion: population included adolescents.

12. Bowers, L., Hammond, N., James, K., Quirk, A., Robson, D., & Stewart, D. (2012). Characteristics of acute wards associated with the presence of a psychiatric intensive care unit, and transfers of patients to it. *Journal of Psychiatric Intensive Care*, *8*(02), 66–77. doi: 10.1017/s174264641200012x
Reasons for exclusion: Didn't fit study criteria

13. Bowers, L., Douzenis, A., Galeazzi, G. M., Forghieri, M., Tsopelas, C., Simpson, A., & Allan, T. (2005). Disruptive and dangerous behaviour by patients on acute psychiatric wards in three European centres. *Social Psychiatry and Psychiatric Epidemiology*, *40*(10), 822–828. doi: 10.1007/s00127-005-0967-1
Reasons for exclusion: Different outcomes.

14. Bowers, L., Werf, B. V. D., Vokkolainen, A., Muir-Cochrane, E., Allan, T., & Alexander, J. (2007). International variation in containment measures for disturbed psychiatric inpatients: A

comparative questionnaire survey. *International Journal of Nursing Studies*, *44*(3), 357–364. doi: 10.1016/j.ijnurstu.2006.01.005
Reasons for exclusion: Didn't fit study criteria and outcomes.

15. Busch, A. B. (2000). Seclusion and Restraint: A Review of Recent Literature. *Harvard Review of Psychiatry*, *8*(5), 261–270. doi: 10.1093/hrp/8.5.261
Reasons for exclusion: Literature review

16. Davies, B., Griffiths, J., John-Evans, H., Lowe, K., Howey, S., & Artt, A. (2016). Changes in staff confidence and attributions for challenging behaviour after training in positive behavioural support, within a forensic mental health setting: a replication study with follow-up. *The Journal of Forensic Psychiatry & Psychology*, *27*(6), 886–906. doi: 10.1080/14789949.2016.1222448
Reasons for exclusion: Forensic setting

17. Delaney, K. R., & Johnson, M. E. (2006). Keeping the Unit Safe: Mapping Psychiatric Nursing Skills. *Journal of the American Psychiatric Nurses Association*, *12*(4), 198–207. doi: 10.1177/1078390306294462
Reasons for exclusion: Study outcomes

18. Deyoung, S., Just, G., & Harrison, R. (2002). Decreasing Aggressive, Agitated, or Disruptive Behavior: PARTICIPATION IN A BEHAVIOR MANAGEMENT UNIT. *Journal of Gerontological Nursing*, *28*(6), 22–31. doi: 10.3928/0098-9134-20020601-08
Reasons for exclusion: Nursing Home setting

19. Didden, R., Duker, P., & Korzilius, H. (1997). Meta-analytic study on treatment effectiveness for problem behaviors with individuals who have mental retardation. *American Journal of Mental Retardation*, *101*(4), 387–399.
Reasons for exclusion: Study population

20. Du, M., Wang, X., Yin, S., Shu, W., Hao, R., Zhao, S., … Xia, J. (2017). De-escalation techniques for psychosis-induced aggression or agitation. *Cochrane Database of Systematic Reviews*. doi: 10.1002/14651858.cd009922.pub2
Reasons for exclusion: Systematic Review

21. Duxbury, J. A. (2015). The Eileen Skellern Lecture 2014: physical restraint: in defence of the indefensible? *Journal of Psychiatric and Mental Health Nursing*, *22*(2), 92–101. doi: 10.1111/jpm.12204
Reasons for exclusion: Narrative review

22. Flannery, R. B., Farley, E., Rego, S., & Walker, A. P. (2006). Characteristics of Staff Victims of Pschiatric Patient Assaults: 15-Year Analysis of the Assaulted Staff Action Program (ASAP). *Psychiatric Quarterly*, *78*(1), 25–37. doi: 10.1007/s11126-006-9024-9
Reasons for exclusion: Study included outpatient settings.

23. Garner, B., Phillips, L. J., Schmidt, H.-M., Markulev, C., Oconnor, J., Wood, S. J., … Mcgorry, P. D. (2008). Pilot Study Evaluating the Effect of Massage Therapy on Stress, Anxiety and Aggression in a Young Adult Psychiatric Inpatient Unit. *Australian & New Zealand Journal of Psychiatry*, *42*(5), 414–422. doi: 10.1080/00048670801961131
Reasons for exclusion: Pilot study and included adolescents

24. Gaynes, B. N., Brown, C. L., Lux, L. J., Brownley, K. A., Dorn, R. A. V., Edlund, M. J., … Lohr, K. N. (2017). Preventing and De-escalating Aggressive Behavior Among Adult Psychiatric Patients: A Systematic Review of the Evidence. *Psychiatric Services*, *68*(8), 819–831. doi: 10.1176/appi.ps.201600314
Reasons for exclusion: Systematic Review

25. Haddock, G., Barrowclough, C., Shaw, J. J., Dunn, G., Novaco, R. W., & Tarrier, N. (2009). Cognitive–behavioural therapy v. social activity therapy for people with psychosis and a history of violence: randomised controlled trial. *British Journal of Psychiatry*, *194*(2), 152–157. doi: 10.1192/bjp.bp.107.039859
Reasons for exclusion: Study included inpatients and outpatients

26. Hallett, N., & Dickens, G. L. (2015). De-escalation: A survey of clinical staff in a secure mental health inpatient service. *International Journal of Mental Health Nursing*, *24*(4), 324–333. doi: 10.1111/inm.12136
Reasons for exclusion: Qualitative study

27. Hodgkinson, P. (1985). The Use of Seclusion. *Medicine, Science and the Law*, *25*(3), 215–222.
Reasons for exclusion: Discussion not a research study.

28. Jensen, C. C., Lydersen, T., Johnson, P. R., Weiss, S. R., Marconi, M. R., Cleave, M. L., & Weber, P. (2012). Choosing Staff Members Reduces Time in Mechanical Restraint Due to Self-Injurious Behaviour and Requesting Restraint. *Journal of Applied Research in Intellectual Disabilities*, *25*(3), 282–287. doi: 10.1111/j.1468-3148.2011.00664.x
Reasons for exclusion: Study objectives and outcomes

29. Jones, N. (2003). Peer-group risk assessment: a post-traumatic management strategy for hierarchical organizations. *Occupational Medicine*, *53*(7), 469–475. doi: 10.1093/occmed/kqg093
Reasons for exclusion: Doesn't fit study criteria

30. Jonker, E. J., Goossens, P. J. J., Steenhuis, I. H. M., & Oud, N. E. (2008). Patient aggression in clinical psychiatry: perceptions of mental health nurses. *Journal of Psychiatric and Mental Health Nursing*, *15*(6), 492–499. doi: 10.1111/j.1365-2850.2008.01261.x
Reasons for exclusion: Qualitative Study

31. Livingston, J. D., Verdun-Jones, S., Brink, J., Lussier, P., & Nicholls, T. (2010). A narrative review of the effectiveness of aggression management training programs for psychiatric hospital staff. *Journal of Forensic Nursing*, *6*(1), 15–28. doi: 10.1111/j.1939-3938.2009.01061.x
Reasons for exclusion: Forensic setting and narrative review.

32. Price, O., Baker, J., Bee, P., & Lovell, K. (2018). The support-control continuum: An investigation of staff perspectives on factors influencing the success or failure of de-escalation techniques for the management of violence and aggression in mental health settings. *International Journal of Nursing Studies*, *77*, 197–206. doi: 10.1016/j.ijnurstu.2017.10.002
Reasons for exclusion: Qualitative study

33. Sandberg, D., McNeil, D., & Binder, R. (2002). Stalking, threatening, and harassing behavior by psychiatric patients toward clinicians. *Journal American Academy of Psychiatric Law*, *30*(2), 221–229.
Reasons for exclusion: Did not fit study question

34. Shimosato, S., & Kinoshita, A. (2018). Degree of Anger During Anger-Generating Situations Among Psychiatric Staff Nurses: Association Between Nurses Attitudes Toward Service Users Aggression and Confidence in Intervening in Aggressive Situations. *Journal of Psychosocial Nursing and Mental Health Services*, *56*(9), 51–59. doi: 10.3928/02793695-20180322-02
Reasons for exclusion: Study outcomes.

35. Spencer, S., Johnson, P., & Smith, I. C. (2018). De-escalation techniques for managing non-psychosis induced aggression in adults. *Cochrane Database of Systematic Reviews*. doi: 10.1002/14651858.cd012034.pub2
Reasons for exclusion: Systematic review.

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