

# Is Deescalation Training Effective in Reducing Violent Incidents in Forensic Psychiatric Settings? – A Systematic Review of the Literature

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## Abstract

**Background:** Inpatient violence is a relevant issue in forensic psychiatric settings. Coercive measures are used as a last resort to prevent further harm although they are often regarded as untherapeutic. In order to enable staff to intervene before inpatient violence or other serious incidents occur and thus to avoid coercion, deescalation training programs are being adopted in general as well as forensic mental health settings. There is growing evidence for the efficacy of de-escalation training in general psychiatry. However, there are no reviews evaluating the effectiveness of deescalation training in reducing violent incidents in forensic psychiatric settings. Here we present the first literature review on the effectiveness of de-escalation training in the field of forensic psychiatry.

**Method:** We searched relevant databases for original research on the effectiveness of reducing violence in forensic psychiatric settings. Studies were included if they investigated staff training programs with deescalation techniques in forensic mental health settings.

**Results:** A total of 6 relevant studies were identified. Only one study was a randomized controlled trial. Four studies were before and after comparisons without control group. A one group post-test-only design was used in one study. Methodological quality was low. The maximum sample size was 112 participants. Results indicated some impact of deescalation training on the rate of violent incidents in forensic-psychiatric wards. Moreover, staff felt safer following the training. However, results have to be interpreted cautiously due to methodological limitations.

**Discussion:** Evidence for the effectiveness of deescalation training on violent incidents in forensic settings remains limited. However, positive changes are reported across a variety of outcome measures providing initial indications that deescalation training might contribute to a reduction in aggressive incidents in forensic psychiatry. High quality studies are required to add to the evidence base on this topic.

## Introduction

In mental health services violence is a current and relevant problem for professionals as well as patients (Staggs 2015). A meta-analysis of 35 international studies including 23,972 inpatients showed that the proportion of patients who committed at least one act of interpersonal violence was 17% (Iozzino et al. 2015). In a recent German study, including 64,367 admissions in psychiatric hospitals, 17,599 aggressive incidents were recorded throughout the year 2019 (Eisele et al. 2021). This study described that 5084 (7.90%) of the admitted patients showed aggressive behavior towards others. Amongst the 1,660 forensic inpatients included in this study, the proportion of aggressive behavior was even higher (20.54%). At least in Germany, data also suggest an increase of violent incidents in psychiatric hospitals over the last ten years (Eisele et al. 2021).

On specialized forensic psychiatric wards there are higher rates of violence compared to general psychiatry (Bowers et al. 2011; Eisele 2021; Ramesh et al. 2020). Violent behaviour includes verbal and physical threats and aggression that may lead to serious injury or death. The risk of these behaviours is significant in forensic settings. This is due to the complex historical and current psychosocial needs of the patient group (Hill et al. 1996). Among other things, the resulting damage includes physical and psychological injuries to fellow patients and staff, diminished therapeutic relationships, lower job-satisfaction of the employees as well as an increase in the number of days of sick leave (Nienhaus et al. 2016; Pekurinen et al. 2017; Roccor et al. 2020; Schablon et al 2018; Zeh et al. 2009).

To manage violent behaviour restraint, seclusion or forced medication are frequently used in psychiatric hospitals as well as in forensic mental health services. However, the use of coercive measures is problematic for patients, staff and organizations. Patients experience coercive measures as dehumanizing, frightening, confusing and at times painful (Hui et al. 2016; Soininen et al. 2016). Moreover, coercive measures such as mechanical restraint or isolation are associated with anxiety and stress for both patients and staff and are widely seen as untherapeutic. These measures, that nowadays are usually used as the last resort to prevent harm, have been found to diminish the therapeutic alliance between staff and patients (Cope and Encandela 2004). Last but not least, both staff and patients might suffer injury using coercive measures (Duxbury et al. 2019).

Therefore it is necessary to intervene before a serious incident occurs. This means, especially in forensic psychiatric settings, staff need to intervene before situations escalate to a level when there seems to be no other choice to using coercive measures to protect

themselves as well as the health and lives of their other entrusted patients. For years, de-escalation training programmes for staff to prevent and reduce violent incidents have been adopted in mental health settings. These training programs intend to promote prevention, relational security and the de-escalation of conflicts. Several different deescalation training programmes are already in use. De-escalation training programmes used in psychiatric hospitals are complex and consist of several elements.

A prototypic example of these programs is the “Six Core Strategies for Reduction of Seclusion and Restraint” (6CS). 6CS is a de-escalation training programme which was developed and is commonly used in the US. 6CS consists of 6 topic areas, namely leadership towards organizational change, use of data to inform practice, workforce development, use of restraint and seclusion reduction tools, improve consumer roles in inpatient setting and the consistent use of debriefing techniques (Azeem et al. 2011; Master et al. 2002, Wieman et al. 2016). 6CS seems to be effective in reducing seclusion and restraint of patients in psychiatric settings (Wieman et al. 2016). Team Strategies & Tools to Enhance Performance & Patient Safety (TeamSTEPPS) is another program used in the US to teach nurses about verbal de-escalation in order to reduce patient aggressive behavior. The results of a recent study evaluating the implementation of the TeamSTEPPS educational program are ambiguous. The authors didn't find a statistically significant difference in the rate of seclusion events before and after implementation of the programme. However, they described that the reduction in seclusion events was clinically significant (pre rate was 5.9%, post rate was 4.4%) (Haefner et al. 2021). A European adaptation of the Six Core Strategies is the REsTRAIN YOURSELF training program that has been evaluated in UK mental health services. It uses a multimodal approach to train staff to reduce the use of coercive measures. The introduction of REsTRAIN YOURSELF was associated with a 22% average reduction in the use of restraint in seven English psychiatric intensive care units over a 13-month period compared to matched wards (Duxbury et al. 2019). Ye et al. examined the effectiveness of a Chinese deescalation training program on reducing physical restraint in psychiatric hospitals (Ye et al. 2021). The program was designed with 5 modules (Communication, Response, Solution-Focused Technique, Care, Environment; CRSCE). CRSCE is a Chinese adaptation of the Six Cores Strategies in the United States and the REsTRAIN YOURSELF program in the United Kingdom. In a small sample (n = 12) Ye et al. found that the intervention reduced the frequency and duration of physical restraints.

A German example is the professional deescalation management program “ProDeMa” (Frank 2019, Weissenberger 2020). The program intends to reduce violent incidents through 7 deescalation levels:

1. Prevention/Reduction of violence through improvements concerning external framework conditions, e.g. aggression inducing ward rules or process flows
2. Change of reaction patterns of the staff through change in interpretation and valuation of inpatient violence
3. Improvement of the staff's understanding of the etiology of violent behaviour
4. Training staff in verbal de-escalation techniques
5. Teaching staff techniques to escape and defend themselves against physical attacks without harming the patient unnecessarily
6. Techniques to immobilize and restrain patients without doing unnecessary harm to them
7. Professional post-processing of escalations including inter-collegial first aid.

A recent systematic review of the literature focusing on the efficacy of the measures that have been studied to date for reducing coercion found that complex intervention programs seem to be particularly effective (Hirsch et al. 2019). The review included 84 studies in total. In 42 studies staff training to improve handling of aggression and violence, as well as de-escalating counseling techniques, were evaluated. On the other hand, it was also found that patient outcomes (e.g. length of admissions, rates of incidents) were worse in a group of patients in which a program to reduce coercive measures (Strategies in Crisis Intervention and Prevention, SCIP) was implemented (Lee, Gray, & Gournay, 2012). Further literature reviews about the effectiveness of deescalation training in reducing the use of coercive measures propose that more evidence is needed to evaluate their effectiveness (Price et al. 2015; Gaynes et al. 2017). All in all, the evidence-base for interventions to reduce coercive measures in general mental health services seems to be rather mixed. Given the adverse effects of coercive measures on patients, staff and organizations, it is crucial that more evidence of the efficacy of training programs to implement interventions to reduce coercive measures is collected and analyzed.

Unsurprisingly, in the field of forensic psychiatry, deescalation training for staff is also implemented. Yet, there is even less evidence on its effectiveness. Therefore the systematic review presented here evaluates the current evidence of deescalation training programs in reducing violent incidents in specialized forensic psychiatric settings.

## Method

In conducting this review we have followed the PRISMA guidelines for reporting systematic reviews (Moher et al. 2019).

## Search Strategy

We conducted a systematic literature search of publications from 2002 (the year ProDeMa was developed) up until December 2021. The search included the electronic data bases Cochrane Library, Ovid PsycInfo, PubMed, Science direct, Scopus and Web of Science. We combined search terms capturing forensic settings with various terms relating to health care professionals as well as deescalation. The full search strategy is included in in the Supplementary Material.

## In- and Exclusion Criteria

Our selection included studies related to the evaluation/assessment of a staff training program to reduce violent incidents in forensic psychiatric hospitals. Particular emphasis was placed on deescalation training around the research question "Is de-escalation training effective in reducing violent incidents in forensic settings?"

## Inclusion criteria

Studies of any type of design were included if they met the following criteria:

- Original research
- Studies in which staff training with a de-escalation techniques component was investigated
- Studies conducted in forensic mental health settings
- Human participants of all ages in forensic mental health settings
- Male and female participants
- Any number of participants
- Studies in all languages and from all countries

## Exclusion criteria

- Conducted in general psychiatric hospitals
- Training without de-escalation elements or attitudinal component
- Non-primary research, i.e. reviews, opinions, discussion papers

## Results

### Search Results

The initial searches returned 15398 potentially relevant titles. Results of the searches were reviewed independently by authors PG and DB for suitability for inclusion in the review against the criteria set out below. This was initially undertaken through inspection of titles and abstracts. A second review appraising the full papers was then undertaken as required. In the event of a difference of opinion over a paper's suitability for inclusion a third author (BV) was consulted. Additionally, authors DB and PG searched reference lists from both included and excluded studies for further suitable papers for inclusion. Using this approach, one more suitable study was found. A total of 174 papers were shortlisted because they seemed to describe studies in a forensic psychiatric hospital having deescalation training as a topic or being about describing the type, severity, frequency or reduction of violent incidents. After screening the abstracts 145 of these papers were excluded because they didn't fit our selection criteria. Thirty full texts were finally screened. 6 papers fulfilled our selection criteria and were consequently included in this review. A flow chart of our search results is set out in Fig. 1. Details of the studies are shown in Table 1.

Table 1  
Study findings

| References        | Study type  | Country / type of unit Location  | Participants  | Intervention  | Outcome measures  | Results   |
|-------------------|---|--|---|---|---|---|
| Isaak et al. 2016 | Before and after comparison without control group | Four forensic departments of a maximum security unit<br>132 beds<br>Israel                           | 112 employees (multiprofessional staff)<br>n = 112<br>Return of questionnaires: 112 pre, 85 post training | Multiprofessional staff training including several deescalation training elements ("Return home safely");<br>3-day workshop | Number of aggressive or violent incidents<br>Number of employees injured due to patient violence<br>Occupational safety climate measured with the Safety Questionnaire (Mearns et al. 2003) | Significant decrease in number of aggressive incidents towards staff: 55 incidents in 2006 (pre intervention) vs.<br>26 in 2008 and 13 in 2013 (post intervention)<br>Significant decrease in number of employees injured: 36 in 2007 (pre) vs<br>24 in 2008/ and 12 in 2009 (post) |
| Isaak et al. 2018 | Before and after comparison without control group | Four forensic departments of a maximum security unit in a mental health center<br>132 beds<br>Israel | Multiprofessional staff<br>n = 112  | Multiprofessional staff training ("Return home safely");<br>annual refresher sessions                                       | Number of aggressive or violent incidents<br>Number of employees injured due to patient violence<br>(Number of absenteeism days)  | Number of aggressive incidents towards staff remains low:<br>55 incidents in 2006 (pre intervention) vs.<br>18 in 2009/<br>8 in 2010/ 6 in 2015/ 16 in 2016/ 13 in 2017 (post intervention)   |

| References              | Study type  | Country / type of unit Location                                | Participants  | Intervention   | Outcome measures   | Results   |
|-------------------------|---|--|---|--|--|---|
| Nesset et al. 2008      | Before and after comparison without control group | Forensic psychiatric hospital<br>16 beds<br>Norway             | Nursing staff:<br>n = 49 (rating 1);<br>n = 48 (rating 2);<br>n = 50 (rating 3)<br>Patients:<br>n = 10 (rating 1)<br>n = 8 (rating 2)<br>n = 8 (rating 3) | 3-weeks nursing staff training program including several deescalation training elements and lectures on milieu therapy | Self-report questionnaire WAS-R (revised Ward Atmosphere Rating Scale) to measure pPatients' and staff's experience of the treatment environment (Experience of involvement, support, practical orientation, angry and aggressive behavior, order and organization, staff control) | Significant decrease in WAS-subscale "Angry and aggressive behavior" (patients and staff)                                 |
| Davies et al. 2016      | Before and after comparison without control group | Medium secure forensic mental health service<br>United Kingdom | 79 staff members  | Staff training in positive behavioral support (PBS)  | Confidence in Coping with Patient Aggression Instrument (adapted version)<br>Challenging Behaviour Attributions Scale<br>Causal Dimension Scale II   | Significant increase in staff's confidence in their ability to manage challenging patient behavior following PBS-training |
| Martin and Daffern 2006 | One group-posttest-only-study                     | Secure forensic psychiatric clinic<br>100 beds<br>Australia    | 69 clinicians   | 2-day workshop and refresher sessions of a staff aggression management/deescalation training program (M4)              | Adaptation of the Confidence in Coping With Patient Aggression Instrument (Thackrey 1987)  | Increase in staff confident in dealing with aggressive patients following training  |

| References           | Study type                          | Country / type of unit Location  | Participants  | Intervention  | Outcome measures   | Results  |
|----------------------|-------------------------------------|--|---|---|--|--|
| Putkonen et al. 2013 | Cluster-randomized controlled trial | Secured national psychiatric hospital<br><br>In 2009 300 inpatients (164 forensically involved)<br><br>Finland | Multiprofessional staff of 2 wards<br><br>88 patients hospitalized on 4 high-security wards | 6-month nursing and medical staff training based of the theoretical principals of the deescalation training program "Six Core Strategies for Reduction of Seclusion and Restraint " program.<br><br>After training 6 months period of supervised intervention . | Monthly incidence rate rations (IRR):<br>Seclusions per 100 patient days.<br>Restrains per 100 patient days, room observations per 100 patient days.<br><br>Seclusion-restraint time (i.e. hours that patients spent in seclusion or restraint)<br><br>Number of incidents of inpatient physical violence against any person, including self-harm<br><br>Number of injuries to patients and staff during the intervention year | Violence decreased on the intervention wards (1,1 incidents per patient per 100 days to 0,4 incidents per patient per 100 days) and on control wards (0,1 incidents per patient per 100 days to < 0,01 incidents per patient per 100 days).<br>Between group differences were not significant for reduction of violence.<br>The severity of violence diminished in the intervention wards. On the control wards violence remained minor. |

## Description of Study Findings

6 articles about the effects of staff training programs with deescalation techniques in forensic psychiatric settings were finally deemed relevant for this review. The considered studies took place in hospitals in Israel (2), Norway (1), UK (1), Australia (1) and Finland (1). Only one study was a (cluster) RCT. One study was designed as a one-group-posttest-only. 4 studies were designed as before-and-after-comparisons-without-control-group. The number of participants per rating ranged from 8 to 112. The training periods lasted from 0,5 days to 6 months.

A cluster-randomized controlled trial studying whether seclusion and restraint could be prevented in patients suffering from schizophrenia without inducing an increase in violence was conducted by Putkonen et al. (Putkonen et al. 2013). The study took place in a partially forensic psychiatric setting, namely a state-run secure hospital in Finland (Niuvanniemi Hospital in Kuopio). Over half (55%) of the 300 adult inpatients were forensically involved. Only the high-security wards, hospitalizing the patient with the highest risk for violence, were included in the study. On the high-security wards there were both, forensically involved and forensically non-involved patients. The intervention consisted of a 6-month nursing and medical staff training based of the theoretical principals of the "Six Core Strategies for Reduction of Seclusion and Restraint (6CS)" program. After 6 months of training, a 6 months period of supervised intervention ("stabilized intervention" from 07/2019 to 12/2019) followed. Methodologically, four high-security wards consisting of 88 beds (n = 88) were stratified by coercion rates and randomly assigned in two numerically equal groups. The intervention wards received training and supervision, the control wards didn't. The rates of

seclusion and restraint days and observation days decreased on both wards but significantly more on the intervention wards (Intervention wards: seclusion-restraint and observation days from 30–15% of the total patient days versus 25–19% on the control wards). Seclusion-restraint time decreased from 110 to 56 hours per 100 patient-days on the intervention wards while it increased from 133 to 150 hours on control wards. Violence (including self-harm) also decreased on both wards though differences were not significant. Overall, the study therefore showed that a deescalation training program can result in a reduction in coercive measures without an increase of violent incidents. On the contrary, the study delivered first indications that deescalation training might be effective in reducing inpatient violence in a forensic setting. Surprisingly, seclusion and restraint were reduced in both, control and intervention group. Putkonen et al. hypothesize that the awareness of the training programme (maybe hinting at the need to reduce coercive measures) might have contributed to a collateral reduction of coercive measures on the control wards. The fact that only patients suffering from schizophrenia were included could be regarded as another limitation of the study.

Isaak and colleagues examined the effectiveness of a 3-day intervention program (“Return home safely”) in a before and after comparison without control group in a high-secure forensic psychiatric (total of 132 beds) setting in Israel (Isaak et al. 2017). The training program was designed to enhance unit safety climate, to reduce patient violence and employee risk of injury from patient violence. The program contains several deescalation components. Day one focusses on personal safety (i.e. how to avoid dangerous situations, self-defense skills, methods for safely restraining patients). Day 2 is mainly about tools for successful inter-staff communication. On day 3 staff issues around organizational learning are addressed (i.e. how to conduct incident investigations after adverse events). The outcome measures consisted of a questionnaire, recording of violent incidents and staff injuries. The 21-item safety climate questionnaire (based on Mearns et al. 2003) distributed to hospital staff immediately before the workshop and again after 6 months contained 3 safety climate measures, i.e. communication about safety issues, procedures and safety reporting and perceived management commitment to safety. Following the training there was a significant improvement in perceived management commitment to safety as well as a marginally significant improvement in communication about safety issues as well as in procedures and safety reporting. The number of violent incidents and staff injuries also decreased significantly. An important limitation of the study is its design, especially the absence of a control group.

The same group evaluated the (long-term) effectiveness of annual refresher training sessions of the training program at reducing critical incidents (e.g. physical aggression towards staff) (Isaak et al. 2018). The authors found that the rate of incidents in the years 2009 to 2017 was kept low in comparison to the pre-intervention years. Again, important limitations of the study primarily are the small sample size and the absence of a control group.

Nesset and colleagues conducted a pilot study in a Norwegian forensic psychiatric hospital consisting of 16 beds in order to investigate whether a nursing staff training program improves the ward atmosphere and patient satisfaction (Nesset et al. 2008). The 3 weeks staff training taught issues around deescalation techniques using lectures as well as role plays. Week one focused on principles of milieu therapy, week 2 on how the nature of work in forensic psychiatry affects the nursing staff emotionally and how to manage patients’ aggressive feelings. In week 3 setting limits was practiced, e. g. in role plays. After the intervention nursing staff received no further teaching but weekly supervision continued and themes from the staff training program became a common element in these supervisions. The perception of the treatment atmosphere was measured by the revised Ward Atmosphere Scale (WAS-R) at three time points: before, immediately after and six months after the intervention (Rossberg et al. 2003). The WAS-R is a self-report questionnaire including 11 subscales of which one measures the perception of angry and aggressive behavior displayed by the patients. Patients and staff reported a significantly lower level in the WAS-subscale “angry and aggressive behavior” after the intervention. The authors concluded that it might be possible to effectively improve the ward atmosphere through conducting a nursing staff training program (Nesset et al. 2009). However, besides the small sample size and the absence of a control group an important limitation of this study is that it didn’t evaluate whether the frequency (as opposed to the subjective assessment of patients and staff) of violent incidents actually reduced.

Davies and colleagues investigated the effectiveness of multiprofessional staff training (79 trainees) in “positive behavioral support” (PBS) in increasing staff confidence and changing attributions of challenging inpatient behavior in a medium secure forensic mental health service in Wales, UK (Davies et al. 2016). Methodologically the study was designed as a before and after comparison without control group. PBS includes de-escalation techniques such as verbal-deescalation and prevention of challenging behaviors. It can be described as a non-aversive approach to preventing and managing challenging behavior (e. g. aggressive/violent behavior of patients) through increasing the confidence of staff in their own abilities dealing with aggressive

patients. Training for qualified staff took one day. It covered theoretical content as well as the practice of associated skills such as identifying primary and secondary prevention strategies of challenging behavior. Training for unqualified staff was limited to half-a-day and covered primarily theoretical aspects. To evaluate the effectiveness of the staff training program Davies et al. used self-report questionnaires. To measure the staff's confidence an adapted version of Thackrey's "Confidence in Coping with Patient Aggression Instrument" (Thackrey 1987) was used. The staff's attributions of challenging inpatient behavior were measured using the "Challenging Behavior Attribution Scale" and the "Causal Dimension Scale". After the intervention the confidence in working with challenging inpatient behavior increased significantly for both qualified and unqualified staff. Particularly for qualified staff, attribution of challenging behavior to external causes increased as well. It could be hypothesized that the staff's confidence and attribution changes might have deescalating effects and thus a violence reducing effect on the wards. However, an important limitation of the study is the fact that it didn't focus on this concrete aspect. There is no evaluation whether the effects extend to objective data, such as numbers of actual incidents. Furthermore, there was no control group.

Martin and Daffern conducted a one-group-post-test-only study evaluating clinician perceptions of personal safety and confidence to manage inpatient aggression in a forensic psychiatric setting (Martin and Daffern 2006) following a staff training programme with a de-escalation techniques component, called M4. M4 consists of a 2-day workshop including theoretical (organizational incidence and patterns of aggression, risk assessment, legal framework, therapeutic culture, crisis communication and deescalation skills, pharmacology, therapeutic interventions, critical incident stress management) and practical elements (self-defense and constraint). All newly-appointed clinicians had to attend the workshop. After that, they were obliged to attend at least three refresher sessions (1,5 hours each) per year. The main outcomes were perceptions of personal safety and confidence to manage inpatient aggression measured using a self-report questionnaire based on Thackrey's "Confidence in Coping with Patient Aggression Instrument" (Thackrey 1987). Clinicians reported the hospital as safe and found themselves relatively confident concerning their ability to manage aggressive patient behavior. Staff training on aggression management was reported as the most supportive factor on confidence in managing aggression. Whether this translates into an actual reduction in incidents can, however, not be concluded from this study and neither whether this positive assessment was objectively related to the training programme. As with most other studies, other limitations were the small sample size and the absence of a control group.

## Discussion

This is the first systematic literature review examining the effectiveness of deescalation training in reducing violent incidents in forensic psychiatric settings. Unfortunately, due to the small number of studies with only one RCT, only tentative conclusions can be drawn. The evidence base concerning the effectiveness of deescalation training in reducing violent incidents in forensic hospitals turned out to be very poor.

In the field of general psychiatry the available results concerning key outcomes (e.g. assault rate, incidence of aggression, use of physical restraint) are mixed. However, some weak indications for the efficacy of deescalation training in reducing violent incidents in general psychiatry can be found (Price et al. 2015; Gaynes et al. 2017). For example, a few studies found a significantly reduced risk of physical assaults on ward level (Price et al. 2015; Needham et al. 2004, Whittington et al. 1996; Rice et al. 1985) respectively a significant reduction of aggressive incidents including verbal aggression and violence towards objects (Price et al. 2015; Needham et al. 2004, Rice et al. 1985). As a consequence, several authors call for deescalation training in forensic psychiatric settings. For example, Bader and Evans state that in order to reduce inpatient violence, training for nursing staff would be as important as direct drug/medical treatment of patients (Bader and Evans 2015). Barr et al. assert that it is necessary for forensic nurses to develop deescalation promoting, restrictive practices reducing and recovery-focused care promoting skills (Barr et al. 2019). Maguire and colleagues also promote staff training with de-escalation techniques components (Maguire et al. 2011). Dexter and Vitacco note that, amongst other effective treatment interventions, aggression- and deescalation training for staff should be implemented in order to prevent violence in forensic hospitals (Dexter and Vitacco 2020). Goodman et al. precise that successful deescalation in a high-secure forensic setting needs strong therapeutic relationships and knowledge about the relationship between trauma and aggression (Goodman et al. 2020). However, regarding the findings of our review, i.e. the lack of research in this area, it's still quite unclear whether these claims and opinions would stand up to empirical scrutiny.

Despite employing an extensive search strategy, in the field of forensic psychiatry we only found 6 relevant studies meeting our inclusion criteria. With one exception (Putkonen et al. 2013), the studies were methodologically rather weak, not employing a

randomized controlled design. Reliance on before and after comparisons without a control group limits the confidence in the reported findings, e. g. of the differences between trained and untrained groups (Engel et al. 2020). In addition, the number of participants was quite small with a range from 8 to 112 participants. Surprisingly, only 3 of the 6 studies (Isaak et al. 2016; Isaak et al. 2018; Putkonen et al. 2013) used “key safety outcomes” (Price 2015) such as rates or severity of violence, aggression, injuries or physical restraint. Two studies reported a significantly reduced number of aggressive incidents towards staff as well as a reduced number of employees injured after the deescalation training intervention (Isaak et al. 2016; Isaak et al. 2018). Another study reported that violence on a forensic ward decreased following the implementation of a deescalation training. However, the result wasn’t significant in comparison to a control group (Putkonen et al. 2013). Concerning the rates of seclusion and restraint (which possibly might be regarded as an indirect indication for a decrease of violence), though, the study showed a significant reduction in comparison to a control group. At best, the remaining 3 studies found indirect indications for the effectiveness of deescalation training in reducing violent incidents in forensic psychiatric settings, such as a lower level of perceived aggressive inpatient behavior (Nesset et al. 2009), a significant increase of the staff’s confidence in working with challenging inpatient behavior (Davies et al. 2016) or an increase in confidence in dealing with aggressive patients as well as in the perception of safety (Martin and Daffern 2006). These studies mainly relied on surveys focusing on self-reported measures regarding the ability to deescalate situations or the subjective perception of aggressive behavior on the wards. Whether this would also translate into effects on actual behavior and a concrete reduction in the number of violent incidents in those settings remains unclear.

We found a noteworthy variation across training programs in terms of topics covered as well as a considerably different number of training days (dosage). This makes it difficult to generalize findings across different studies employing different training programs. Participants might tend to answer surveys in the direction of social desirability causing overestimates in the positive effects of training on domains assessed through trainees’ self-reports (Engel et al 2020, Lange and Dewitte 2019). Only one study evaluated the long term effects of deescalation training (Isaak et al. 2018)

In conclusion, there are some positive changes reported across a variety of outcome measures indicating that deescalation training might lead to increased confidence in staff dealing with aggressive incidents and possibly also a reduction in aggressive incidents in forensic psychiatry. Importantly, we found no indication that training was associated with any adverse effects. .As inpatient violence is an important topic in forensic psychiatric settings it is somewhat surprising that there hasn’t been more focus on the evaluation of deescalation training in this field of psychiatry. More research is clearly needed to examine whether findings hinting at the effectiveness of deescalation training in general psychiatric settings can be replicated in forensic psychiatric settings. Future research on this topic shouldn’t neglect objective key outcomes like assaults on staff and other patients, injuries of staff and patients, inpatient verbal aggression and violence towards objects as well as use of physical restraints. Subjective measures like job satisfaction and the subjective sense of security on the part of staff and inpatients should be evaluated, as well. Of course, it would be necessary to find out how long the effects last. High quality large sample studies are required to create a sufficient body of evidence concerning this topic.

## **Declarations**

## **Ethics approval and consent to participate**

Not applicable.

## **Consent for publication**

Not applicable.

## **Availability of data and materials**

Not applicable.

## **Competing interests**

The authors declare no financial or non-financial competing interests.

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## Authors' contributions

DB, PG and BV designed the study. PG led on the searches. All authors were involved in the analysis and interpretation of results as well as the manuscript preparation. All authors approved the final version of the manuscript.

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## Figures

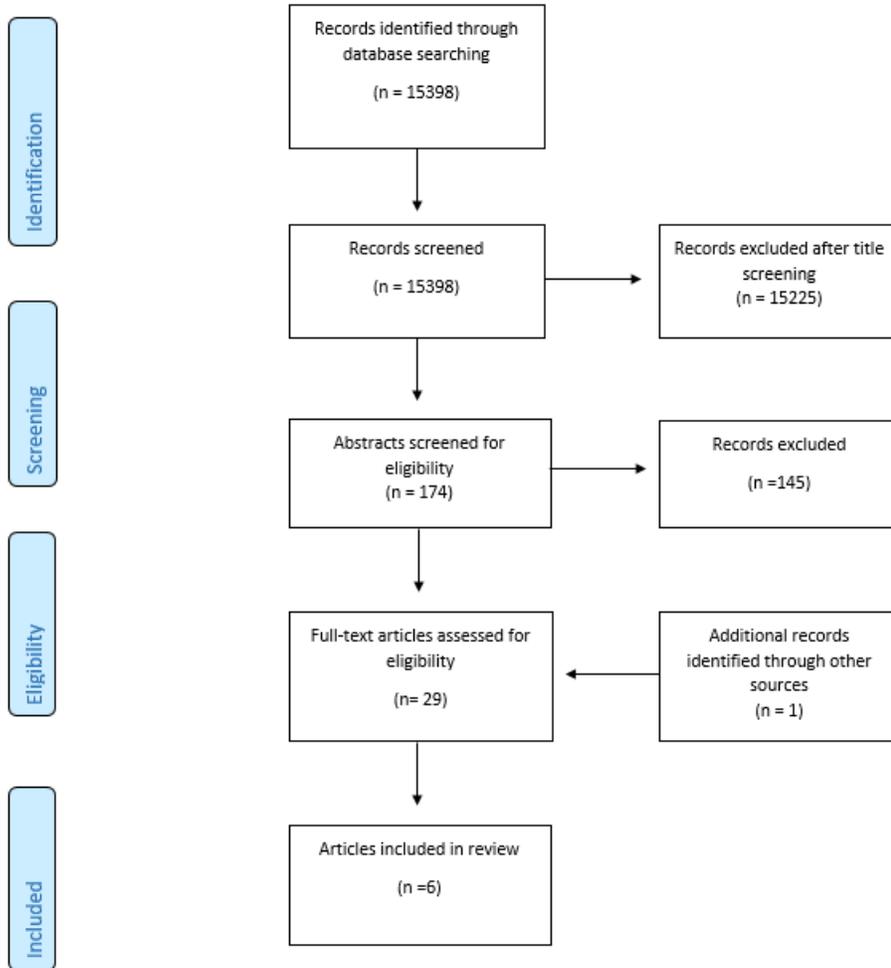


Figure 1

Flow of literature search results

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