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Effective interventions to prevent aggression against doctors: A Systematic Review

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Title: Effective interventions to prevent aggression against doctors: A Systematic Review

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Effective interventions to prevent aggression against doctors, a Systematic Review

Abstract

Background: international studies demonstrate that aggression against physicians is a well-known and serious occupational hazard.

Objective: To find out if there is evidence on effective interventions to prevent aggression against doctors in general and against the general practitioner in particular.

Methods: This systematic review searched the available literature and reported its findings in accordance with the PRISMA guidelines.

Results: 44 studies are included in this review. One RCT provided moderate evidence that a Violence Prevention Program was effective in decreasing risks of violence. Major risk factors for violence are long waiting times, discrepancy between patients' expectations and the services offered alcohol or drug abuse by the patient and a psychiatric condition. Appropriate workplace design and work policies aim to reduce risk factors for violence but there is no hard evidence on the effectiveness of these interventions. One RCT provided evidence that a patient risk assessment combined with tailored actions decreased severe events of aggression in psychiatric wards. Applying de-escalation techniques during an event of aggression is highly recommended. Post-incident reporting followed by root cause analysis of the incident provide the basic input for review and optimisation of the Violence Prevention Program.

Discussion: This systematic review demonstrated that few studies have been successful in providing evidence on efficacy of interventions to prevent aggression against doctors.

Conclusion

Aggression against physicians is a well-known and serious occupational hazard. There is moderate evidence that an integrated Violence Prevention Program can decrease the risks of patient-to-worker violence. We believe that a large cohort study could provide more evidence on effective interventions to prevent aggression against the general practitioner.

Strengths and limitations of this study

- This review documented interventions to prevent and de-escalate aggression against doctors
- All available medical databases were explored in answer to the research questions
- All types of research and publications were included
- The review failed to gather sufficient numeric data to perform a meta-analysis

Keywords: aggression, workplace violence, interventions, doctors, general practitioner

Word count 3777

Introduction

Aggression against physicians including verbal, physical and psychological aggression is a well known and serious occupational hazard. The prevalence of violence in health care is extensively documented through large studies in various settings and populations. Subjective interpretation of violent behaviour and underreporting of workplace violence is consistently cited in literature and leads to heterogeneity in results and conclusions.

A large, nationwide Australian study (MABEL) reported on the 12-month prevalence of verbal or written and physical aggression in Australian clinical medical practice: 70.6% of 9951 Australian doctors experienced verbal or written aggression and 32.3% experienced physical aggression in the previous 12 months. More specifically the 12 month prevalence of verbal aggression towards general practitioners was 54.9%, the physical aggression was 23.4%.(1) In a survey in the UK 78% of all GPs experienced at least one verbal incident in the previous 2 years.(2) A recent cross-sectional study among Flemish General Practitioners (GPs) showed that only about 5% of GPs never encountered aggression. Most frequently the aggression was verbally however, about 20% reported physical aggression and almost 8% report sexual aggression.(3)

A recent nationwide German Survey reported that 91% of GPs had been object of aggression in their career and 73% in the previous 12 months.(4) Typically, the highest rates of physical aggression were found in emergency departments and in psychiatric units. A recent Systematic Review and meta-analysis showed a pooled incidence of 36 of every 10 000 presentations to the emergency department of which 44% were associated with drug and alcohol exposure.(5) More than one quarter of emergency physicians reported that they were victims of physical assault in the past year.(6) A large RCT in hospital setting identified between 8 and 15 reported violence events per 100 full time equivalents per year in the hospital.(7)

In the health care setting, the most common type of workplace violence is where the perpetrator is the patient or a relative of the patient. These events are categorized in literature as "type II workplace violence". Exposure to work place violence can lead to physical and psychological injury, reduced job satisfaction and detachment and affects the quality of care.

Despite the heterogeneity in reports about workplace violence in the health care sector there is consensus that safety action plans should be established and implemented. Therefore, the primary research question in this study is: "What are effective interventions to prevent aggression against doctors in general and against the general practitioner in particular?"

Methods

This systematic review is performed according to PRISMA guidelines. (8) For the randomized controlled studies the risk of bias was assessed and reported using the Cochrane classification scheme for bias.(9)

Eligibility Criteria

Abstracts published in English between January 2000 and January 2018 were screened for inclusion. Eligible studies focussed on prevention of type II Workplace Violence: verbal, physical and psychological aggression from a patient or a patient's relative to a health care worker (in General Healthcare, Psychiatric departments, Emergency Departments, Emergency Primary Care, General Practice) Studies focussing on 'aggression' by co-workers were excluded. Eligible studies reported on risk factors, workplace violence prevention or strategies to reduce workplace violence. Qualitative and quantitative intervention studies were included. Systematic reviews and Reviews on prevention strategies were included. Single case reports or opinion articles were excluded.

Search strategy

Databases utilized were Pubmed, Embase, TRIP, Cochrane and Psycharticle with different search strategies (see appendix). The following search terms/Mesh terms were used: aggression, violence, physician, doctor, workplace, prevent*, strateg*, intervent*, general practitioner, health care. The the reference list of articles was scanned additionally. A separate search was performed on Google and www.guideline.gov.

Data collection and analysis

The selected intervention studies were grouped in two groups: quantitative and qualitative studies. The Systematic Reviews were reported separately. For each selected study, the design, type of intervention and key findings were analysed. A level of evidence was attributed to each quantitative study based on the Oxford 2011 Levels of Evidence (10). The quantitative studies were rated according to the GRADE (11)(12). For the qualitative studies the GRADE-CERQUAL approach was used to assess quality (13).

Outcome measures

For evaluation of effectiveness of the intervention, the primary outcome of interest was patient aggression towards healthcare workers. Secondary outcomes were risk factors, staff knowledge, staff skills, and early detection of aggressive behaviour. Per type of intervention, the major findings were extracted and discussed.

Results

The total harvest of articles is presented in appendix 1. In total 105 full text articles were read and assessed for eligibility, 44 studies of which 15 quantitative, 15 qualitative studies, 7 systematic reviews and 7 reviews are included in this review.

Summary of results

The results of the quantitative studies are presented in table 1, those of the qualitative studies in table 2. Table 3 summarizes the Systematic Reviews and other Reviews
Table 4 gives an overview of frequently cited guidelines.
Table 5 summarizes the factors that may increase the risk of Workplace Violence.

Studies reporting on Interventions

The interventions most frequently discussed and evaluated through are grouped. The first group of interventions was labelled as pre-event preventive measures: components of an integrated violence prevention program. The second group was labelled as interventions taking place during a violent event: applying de-escalation techniques and activating specific violence emergency procedures. The third group was labelled as post-incident interventions: incident reporting followed by root cause analysis of the incident and review of violence prevention policy.

Pre-event preventive measures

Under this label two types of interventions were identified: violence prevention programs and risk assessment and risk control measures.

Violence Prevention Programs

A variety of violence prevention programs have been developed in order to prevent work place violence and to manage and mitigate the impact of violence at work. They all propose an integrated approach incorporating basic elements such as, a worksite risk analysis, hazard prevention and

control measures, safety training and education, violent event reporting and evaluation. Some programs explicitly apply the Plan-Do-Check-Act model of continuous quality improvement. *Arnetz et al.* investigated in a large RCT the effect of the Plan-Do-Check-Act model, through a data driven worksite based intervention in 41 units across 7 hospitals in US over a period of 5 years. (14) The study provided moderate evidence of this approach in decreasing risks of patient-to-worker violence and related injury at six months post intervention: the incident rate ratio (IRR) of violent events was significantly lower on intervention units compared to control: IRR 0.48, CI (0.29-0.80). However, this effect was not confirmed over time during the 24 month follow up period. At that time, only the violence related injury was lower on intervention units compared to control (IRR 0.37, CI (0,17-0.83)). *Lipscomb et al.* evaluated in a 4 year study the impact of the implementation of the OSHA guidelines and compared 3 intervention groups with 3 comparison groups in mental health facilities. (15) Both the intervention and the comparison group implemented safety preventions but the comparison group did not benefit from the support of the additional project team on violence prevention. The staff in both intervention and comparison group reported significant improvements in the OSHA elements: management commitment, employee involvement, and hazard assessment and hazard control activities. Intervention facilities reported also significant improvement in the training element. There was no significant reduction in physical assaults in the intervention group nor in the comparison group. There was a significant increase in threats in the intervention group (+98%, $p < 0.001$). The authors suggested a greater tendency to report less severe events in the intervention group as a possible interpretation for this unexpected finding. *Mohr et al.* investigated in a longitudinal study the impact of the implementation of a Workplace Violence Prevention Program (WVPP) and its different dimensions in 138 Veteran Health Care Facilities. (16) Overall there was no significant change in assault rates over time. The training dimension showed a significant but moderate 5% reduction in standardised incidence rate. The authors argue that the large variation across the facilities and the underreporting prior to WVP program might provide an explanation for the results. *Magnavita et al.* studied the effect of an aggression minimization program in a small scale psychiatric unit in Italy. The interventions included changes in architecture and work organization and training of employees. A stable and significant reduction in assault rate per employee from 0.24 to 0.04 per year was reported. (17)

Risk assessment and risk control measures (Table 5)

Violence risk assessment and violence management are intrinsically connected. The risk factors can be categorized based upon their source of origin: workplace design, work organization, patient factors, physician factors and social context. Numerous studies confirmed the following items as main risk factors for aggression: long waiting times, discrepancy between patients expectations and the services offered, alcohol or drug abuse by the patient and a psychiatric condition. Subsequent to the specific violence risk assessment, taking appropriate risk control measures is the next step. Changes to the physical environment and work policies are based on situational crime prevention and aim to increase the effort of criminal activity, increase the risk of getting caught, reduce the rewards of criminal activity, reduce provocations and remove excuses for disruptive and violent behaviour. (18)

The proposed changes to the physical environment vary across the different health care settings and may include effective indoor and outdoor lighting, sufficient exit routes, physical barriers for receptionists, automatic door locks, video cameras, panic buttons, portable alarms, comfortable waiting areas to reduce stress. No concrete evidence exists on the effectiveness of these interventions. (19) (6)(20)(21)(22) In some emergency departments in the US, metal detectors have been installed, although they may theoretically mitigate violence, there is no concrete evidence to support this expectation. (6)

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3 Adequate work policies include “zero tolerance” policies, incident reporting, training of staff,
4 adequate staffing, policies on drug prescription and storage, a roadmap to follow when faced with
5 aggressive behaviour and additional measures for out-of-hours services. Drugs, cash and
6 prescriptions should be stored in locked places and limited amounts. Long waiting times should be
7 managed by improving staffing levels during busy periods and by setting up courtesy message
8 systems to alert patients about delays.(21)(23) Some guidelines and studies propose a “zero
9 tolerance policy” with explicit statement and warning signs stating that violence will not be
10 tolerated. It is important to recognize verbal assault as a form of workplace violence since it is a risk
11 factor for physical violence. (21) Some authors advise to restrict or withdraw access to general
12 practice or emergency department services for patients with a history of violence.(18) However, this
13 also might compromise the equality of access to care principle and there is no evidence on the
14 impact on violence reduction. General practitioners should take additional measures for out-of hours
15 house call services such as using a central dispatch centre or a shared visit schedule and tracking
16 system. Additional support might be provided in certain circumstances or upon request of the GP.
17 *Ifediora et al.* investigated the implementation of safety measures by GPs on after-hours call services
18 in Australia: overall 43% of doctors adopted protection measures while on after-hour house calls, for
19 example, 34% used additional chaperones or security personnel. The study did not investigate the
20 impact of these measures on violence incidents.(24) *Morken et al.* investigated in a cross sectional
21 study the implementation of 22 safety recommendations in 210 Emergency Primary Care Centres in
22 Norway. The study gives provides an indication on the perceived usefulness and feasibility of the
23 recommendations.(25)

24 Training of staff in communication skills, violence and de-escalation techniques should be included in
25 a comprehensive violence prevention program. Effective training on de-escalation should focus on
26 cognitive, affective and skills based improvements. Self-awareness and the ability to connect
27 interpersonally are crucial. *Price et al.* investigated in a systematic review, the cognitive and affective
28 outcome and the effectiveness of training on violence. There is currently limited evidence that this
29 training has an effect on de-escalation of aggressive behaviour.(26) As discussed hereafter, de-
30 escalation is a highly skilled intervention and this may explain the limited effectiveness of time-
31 constraint training programs.(27)

32 With respect to patient risk factors, the risk of violence is dynamic and contextual.(28) Violence in
33 medical health care is mostly impulsive and accompanied by the fight flight response although also
34 premeditated aggression occurs. Patient aggression risk assessment tools have shown to be effective
35 as a predictor for short-term violence. *Abderhalden et al.* investigated in a RCT the use of short-term
36 risk assessment in 14 acute psychiatric wards in Switzerland. The intervention consisted of a
37 structured risk assessment twice daily combined with a communication of risk scores and a
38 recommendation for actions tailored to the risk level. The study showed a significant reduction in
39 severe events of patient aggression, a significant reduction in attacks and a significant reduced need
40 for coercive measures.(29) Flagging patients with a history of violent events resulted in a 90%
41 reduction in assault by high risk patients in Veteran Health Care hospitals in US.(30)

51 *Interventions during event*

52 During the event of violence the following recommendations are described in guidelines and
53 literature: stay calm and apply de-escalation techniques, if de-escalation fails, take care of your own
54 safety, go away or use self-defence techniques and activate the emergency procedure.
55 The use of restrictive interventions should only be done in accordance with pre-established protocols
56 and in a manner that complies with the Human Rights.

57 De-escalation is not only in the medical care sector but also in other settings a highly recommended
58 component of violence prevention. Garriga et al. (table 3) carried out a systematic review on
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3 assessment and management of agitation in psychiatry. (31) After identification of possible medical
4 causes for agitation, verbal de-escalation and environmental modification are the first choice of
5 intervention.

6 As established by *Richmond et al.*, de-escalation can be successful in less than 5 minutes. Non-
7 coercive de-escalation is practiced in a 3- step approach: firstly the patient is verbally engaged,
8 secondly a collaborative relationship is established and thirdly the patient is verbally de-escalated
9 out of the agitated state table 2.(32) De-escalation frequently takes the form of a verbal loop in
10 which the clinician listens to the patient, finds a way to respond that agrees with or validates the
11 patient's position and then states what he wants the patient to do. The clinician may have to repeat
12 the loop a dozen or more times and inexperienced clinicians tend to give up.(27)

13 Similar principles of de-escalation have also been described by *Kohlrieser*, a psychologist and hostage
14 negotiator.(33)

15 *Post-incident measures*

16 As studied by *Geoffrion et al.* individual and organizational factors can lead to trivialization of
17 workplace violence, a culture of silence and underreporting of workplace violence. Two aspects play
18 a role in trivialization of workplace violence: normalization of violence as being "part of the job" and
19 taboo: avoiding an open discussion out of fear of being stigmatized as incompetent and thus
20 refraining from complaining about it. Colleague and employer support, training on violence, zero
21 tolerance policy all contribute to normalization of violence but decrease the likelihood of taboo.
22 Organizations should be aware of this paradox and may be implicitly sending the message that
23 violence is to be expected.(34)

24 Reflecting on incidents or performing a root cause analysis in team specific workshops can identify
25 systematic weaknesses and potential solutions, action plans and revision of the WPV policy.(35)
26 Victims should be provided with assistance and support while addressing short and long-term
27 consequences. *Schat et al.* investigated the effect of organizational support in reducing the negative
28 consequences of workplace violence and found a small positive effect on emotional wellbeing,
29 somatic health and job related affect but there was no effect on fear of future violence and job
30 neglect.(36)

Discussion

Summary of main results

This review demonstrated that few studies have been successful in providing evidence on efficacy of interventions to prevent aggression against doctors and more specifically against the general practitioner. Only one RCT provided moderate evidence that a Violence Prevention Program was effective in decreasing risks of patient-to-worker violence and related injury.(14) By contrast, longitudinal studies showed conflicting results in assault rates after implementation of a Workplace Violence Prevention Program.(16)(37)(30) Appropriate workplace design and work policies aim to reduce risk factors for violence such as long waiting times and crowded waiting areas but there is lack of hard evidence on the proposed interventions.(6)(20)(21)(22) During the event of violence or agitation, applying de-escalation techniques is a highly recommended component of violence prevention and physical restraint should be considered as a last resort strategy.(31) Post-incident interventions such as incident reporting followed by root cause analysis of the incident provide the basic input for review and optimisation of the Violence Prevention Program.

This review included quantitative and qualitative studies, focussing not only on violence incidence rates but also on why and how an intervention works. Although there is lack of hard evidence on the effectiveness of Occupational Health and Safety Management Systems, there is wide consensus that the implementation of a comprehensive health and safety prevention plan is the key to understanding, preventing and dealing with Workplace Violence.(38) As stated by *James* in his book *Violence assessment and intervention*: 'Preparation is critical as long as you accept that whatever you plan for and however you plan for it to occur, will never happen. Preparation is the "primer" to get you propelled toward resolve and is important in addressing a crisis.'(39)

A work site-specific violence risk assessment provides the basic input for interventions. Major risk factors for violence are long waiting times, discrepancy between patients expectations and the services offered, alcohol or drug abuse by the patient or a psychiatric condition. Specific risk control measures on the level of work policies to ensure adequate staffing and reduce waiting times and training personnel in de-escalation seem rational interventions even without hard evidence. The dynamic nature of risk feeds the issue of unintended consequences or the "intervention dilemma". This dilemma states that any intervention has the capacity to reduce risk does not affect risk or even intensifies risk.(28) On the level of workplace design and work policies, a 100% security will never be obtained. A balance has to be made between safety and quality of life and quality of care.(39) Some interventions proposed to increase safety may be in conflict with the goals of health care. For example, a zero tolerance policy or flagging patients with violent history can lead to stigmatization of the patient and can be in conflict with patient confidentiality and the right to medical care. Implementation of overt measures such as security guards or barricades between staff and patients might impair the doctor-patient relationship, which can lead to a spiral of fearfulness and suspicion and ultimately a greater risk of violence. Evidence suggests that individuals with an increased risk for violent acts are not violent at all times nor in all situations.(20)

During the event of violence or agitation, de-escalation is a highly recommended component of violence prevention, not only in the medical care sector but also in other settings such as in hostage negotiation.(31) De-escalation, if undertaken with genuine commitment and with the collaborative goal of "helping the patient calm himself" has successful outcome in far more cases than previously thought possible and it can be successful in less than 5 minutes.(32). De-escalation is a highly skilled intervention and this may explain the limited effectiveness of time-constraint training programs.(27) With respect to post-incident interventions, incident reporting and follow up of violent incidents is crucial. Underreporting is a well known issue in Workplace Violence Management. It is partly due to normalization of violence as being part of the job and perceived taboo associated with complaining about violence. Underreporting is influenced by interventions itself and complicates research and interpretation of results.

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3 Victims of type II Workplace Violence should be provided with assistance and support while
4 addressing short and long term consequences.(36) A decline in frequency of assaults occurs after
5 implementation of a peer help program for assaulted staff and unavailability of debriefing is
6 associated with increased reports of post-traumatic stress.(40)
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8 9 *Limitations*

10 The first limitation lies in the risk of bias across studies since mainly English and some French,
11 German and Dutch publications were screened. Second, research on Work Place Violence is also
12 published outside the traditional international medical scientific literature databases.
13 The second limitation lies in the risk of bias within studies. Only three randomized controlled trials
14 are included in this review.(14) (29) (41) Performance bias, detection bias and reporting bias are
15 present in all studies. First, due to the nature of the problem and the interventions, allocation
16 concealment, blinding of participants and blinding of outcome assessment is not possible. Second, as
17 discussed in this review, underreporting and selective reporting is a well known issue in Workplace
18 Violence, is variably present in all studies and is influenced by the intervention itself.(14) Recall bias
19 is also present due to data collection in the form of questionnaires inquiring about violent events
20 over the past 12 months.(41) Third, performance bias is present in all studies through various
21 mechanisms: a medical care setting is a complex structure and organisational changes might have an
22 impact on care quality and on safety performance and might interfere as a co-intervention.
23 Moreover in all randomized controlled trials, the control group will always have its own safety
24 prevention policy.
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29 *Suggestions for further research*

30 We believe that a large cohort study could provide more insight and evidence on effective
31 interventions to prevent aggression against the general practitioner. The cohort would consist of a
32 large sample of general practices with a comparable socio-economic patient population.
33 Risk factors for type II workplace violence are well known, however there are insufficient data on
34 protective factors for aggression against doctors. Analysis of large amounts of data on the cohort
35 should have enough statistical power to provide insight in the protective factors and effectiveness of
36 interventions against type II workplace violence.
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38 With respect to preventive measures, a yearly update on the applied safety measures and other
39 characteristics per general practice is to be determined. This can be obtained through questionnaires
40 complemented with sample audits for verification of validity of the responses.
41 Basic information on recommended safety prevention measures and training on de-escalation
42 techniques should be made available to the cohort.
43 With respect to post-event interventions, the general practitioners in the study cohort could
44 implement a shared violence incident-reporting tool.
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48 **Conclusion**

49 Aggression against physicians is a well-known and serious occupational hazard. There is moderate
50 evidence that an integrated Violence Prevention Program can decrease the risks of patient-to-worker
51 violence. Appropriate workplace design and work policies aiming to reduce risk factors and applying
52 de-escalation techniques during an event of aggression are highly recommended. Taking into
53 account that detection, reporting and performance bias will inherently be present in any RCT on
54 interventions against Type II workplace violence, we believe that a large cohort study could provide
55 more evidence on effective interventions to prevent aggression against the general practitioner.
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Tables

GP: General Practice, ED: Emergency Department, WPV: Workplace Violence, Psy: Psychiatric setting, Gen: General Health Care, EPC: Emergency Primary Care; ICU: Intensive Care Unit, GER: Geriatrics
 Level according to Oxford 2011 levels of evidence.
 Outcome quality rating in accordance with GRADE methodology.

Table 1 Summary of selected quantitative studies

Reference	Setting	Level/Grade	Study design	Intervention	Outcome	Results (Grade)
Arnetz et al., 2017 (14)	US, 7 hospitals, 41 units, 2800 employees,	Level 2 Moderate	RCT intervention 5 years, 4 phases Data driven, worksite based intervention plan-do-check-act Hazard Risk Matrix to identify high risk units in intervention and control groups	<ul style="list-style-type: none"> Plan-Do-Check-Act model data driven and worksite based intervention stakeholder involvement 	<ul style="list-style-type: none"> rates of violent events rates of violent related injuries intervention compared to control group evolution over time compared to baseline 	Rates of violent events: <ul style="list-style-type: none"> Six months post intervention, incident rate ratio of violent events (IRR) was significantly lower on intervention units compared to control IRR 0.48 CI (0.29-0.80) Rates of violence decreased slightly but not significantly in the intervention group compared to baseline and increased significantly in the control group compared to baseline. Significantly increased violent event rates at 24 months compared to baseline in both groups: Intervention group from 8 to 13.8 per 100FTE and control group from 8 to 15.4 per 100 FTE. Violence related injuries: <ul style="list-style-type: none"> 24 months post intervention, the violence related injury was lower on intervention units compared to control IRR 0.37 CI (0,17-0.83)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						Remark: results were not consistent over time during 24 month follow up period.
Abderhalden, 2008 (29)	14 Acute psychiatric wards, 2364 patients Switzerland PSY	Level 2 Moderate	Randomised Controlled Trial: 14 acute psychiatric wards, 2364 patients phase 1: 3 months baseline data phase 2: 3 months intervention period	<ul style="list-style-type: none"> structured short term risk assessment : Swiss version of Brøset Violence Checklist, 2 times per day during first 3 days in case of high risk (1 in 10 patients will physically attack during next shift): discuss possible prevention measures from list in case of very high risk (1 in 4 patients): multidisciplinary team discussion on preventive measures and plan and implement preventive measures. 	<ul style="list-style-type: none"> risk assessment incident rates staff observation aggression scale attacks coercive measures 	<ul style="list-style-type: none"> Significant reduction in severe events of patient aggression: adjusted risk reduction 41% intervention versus control 15%, p < 0.001 Significant reduction in attacks: 41% versus 7%, p < 0.001 Significant reduced need for coercive measures : 27% reduction in intervention group versus 10% increase in control, p < 0.001 Structured risk assessment twice daily in acutely admitted psychiatric patients combined with a communication of risk scores and a recommendation for action tailored to risk level reduced the incidence rate of coercive measures and severe aggressive incidents.
Arnetz, 2000 (42)	47 health care work places 1500 nurses in Emergency departments, geriatric, psychiatric, home healthcare	Level 3 Low	RCT Implementation and evaluation of a practical intervention program for dealing with violence towards health care workers.	<ul style="list-style-type: none"> violence incidence form in intervention and control group structured feedback program in intervention group 	<ul style="list-style-type: none"> awareness of risks of violence ability to deal with aggressive situations exposure to violent incidents 	<ul style="list-style-type: none"> better awareness of risk situations and of how to deal with aggressive patients (Low) 50% increase in incident reporting in intervention group compared to control group (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2006 (15)	Sweden ED, Psy, GER New York State 26 units: 6 units selected Psy	Level 3 Low	<ul style="list-style-type: none"> evaluation of the impact of OSHA guidelines on workers health and safety 3 intervention groups, 3 comparison groups base line and post intervention survey 4 years study 	<ul style="list-style-type: none"> OSHA guidelines serves as framework 1. Management commitment to Violence Prevention Program 2. Employee involvement in VPP 3. Hazard assessment activities 4. Hazard control activities: infrastructural, organizational, environmental, administrative, behavioural 5. Training 	<ul style="list-style-type: none"> staff perception of quality of program elements frequency of reported threat and physical assaults in intervention and comparison facility pre- and post-intervention 	<ul style="list-style-type: none"> Staff in both intervention and comparison group reported significant improvements in first 4 elements of the OSHA elements (Low). Intervention facilities reported significant improvement in the training element. (Low) No significant reduction in the change in physical assaults in intervention group nor in comparison group Significant increase in threats of assault in intervention group (+98%, p <0.001), a non significant increase in comparison group (+47%, p= 0.08) remark: Both the intervention and the comparison group did implement safety preventions but the comparison groups did not benefit from the support of the team resources of the worksite violence study.
Magnavita, 2011	small scale psychiatric unit Italy about 85 workers	Level 3 Low	<ul style="list-style-type: none"> pre- and post intervention comparison test 	aggression minimization program as part of total quality management 1) architecture and work organization: <ul style="list-style-type: none"> rearrangement of building, 3 assistance 	<ul style="list-style-type: none"> Violence Incident Form assault rate: pre and post-intervention 	<ul style="list-style-type: none"> Mean assault rate per employee was significantly reduced from 0.24 per year to 0.04 per year after the intervention Stable decline over time in assaults after the intervention

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
				areas depending upon severity of mental illness • increased nurse-to-patient ratios, staff coverage • remove patients from monitoring tasks • improved lighting • safety alarms 2) Education	• assault rate for aggression using physical force • verbal abuse etc, not addressed	
Kling, 2011(43)	acute care hospital Canada 109 cases	Level 3, Low	pre- and post – intervention study evaluation of violent risk assessment system and retrospective case control	Violence risk assessment flagging in patient file and on wrist band and violence prevention training taking precautions such as : wearing personal alarm, security team nearby, not entering patient room alone, not having sharp objects	• violent incident risk • adjusted OR for violence in flagged patients	During intervention compared to pré-intervention • RR hospital: 0.57 (0.33-1.83) (not significant) • RR direct patient care workers: 0.52 during intervention (0.33-0.81) • RR high risk department: 0.39 (0.24-0.61) Post intervention compared to pre-intervention • RR hospital 1.01 (0.989-1.04) • RR direct patient care workers 1.03 (1.00-1.06) • RR high risk department: 1.04 (1.01-1.07) In contrast to hypothesis: • adjusted OR for violent incident 6.28 for patients flagged by the Alert System

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Mohr, 2011(16)	138 Veterans Health Care Facilities	Level 3 Low	<ul style="list-style-type: none"> • Longitudinal study • Impact of implementation of a workplace prevention program on rates of workplace violence over a period of 6 years: 2004-2009 • Relationship of assault rates with WPV dimension score • percentage change in assault rates in 2009 compared to 2004 	<ul style="list-style-type: none"> • Implementation of a Workplace Violence Prevention Program • WVP dimension score 	<ul style="list-style-type: none"> • 43 WVP items, grouped in 3 dimensions : training, workplace practices, environmental control and security • standardized assault rate 	<ul style="list-style-type: none"> • Overall there was an increase in assault rates over time: from 59 to 71 per 10.000 FTE • 34% of facilities had reduced assault rates, average improvement 42% • Facilities with no reduction had an average increase of 125% in assault rate • Training dimension: significant but moderate 5% reduction on standardised incidence rate (Low) • No significant change in assault rates over time possible explanation: <ul style="list-style-type: none"> • Large differences in facilities in assault rate reduction or increase • Underreporting prior to WVP program • Reduction in severity of assaults (workers compensation claims declined 40% between 2001 and 2008)
Hvidhjelm, 2014 (44)	forensic psychiatry, 156 patients Denmark Psy	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • sensitivity and specificity of the Brøset Violence Checklist • 156 patients, checked 3 times per 	<ul style="list-style-type: none"> • BVC 6 items checklist as predictor of short-term (<24u) risk of violence • score 6 items: presence or absence of: confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> • risk of violence within 24 hours 	<p>BVC showed overall satisfactory specificity and sensitivity as a predictor of short term risk of violence, (Low) score ≥ 3:</p> <ul style="list-style-type: none"> • sensitivity : 65.6%, • specificity 99.7% with overall risk 0.3%: • PPV score ≥ 1: 17.5%

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			day during 24 months			<ul style="list-style-type: none"> • PPV score ≥ 3: 37% • NPV score < 3: 99.9%
Partridge, 2017 (45)	Emergency Department, 2046 patients Australia ED	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • statistical utility of the Brøset Violence Checklist by a security officer in emergency department 	<ul style="list-style-type: none"> • predicting aggressive patient behaviour using the Brøset Violence Checklist by security officers in ED 	<ul style="list-style-type: none"> • short term risk of violence 	BVC showed a good sensitivity, specificity and predictive value of short term risk of violence, (Low): overall risk 1.7% <ul style="list-style-type: none"> • score ≥ 1: PPV 16.7% , LR+ 11.6 sensitivity 88.6%, specificity 92.4% • score ≥ 2 : PPV 34.2%, LR+ 30.3 sens. 65.7%, spec. 97.8% • score ≥ 3: PPV 55.2 % ,LR+ 71.4 sens. 45.7%, spec. 99.4%
Morken, 2013 (46)	210 Emergency Primary Care Centres Norway GP	Level 5 Very Low	Cross sectional study, survey on application of 22 safety measures items in 210 Emergency Primary Care Centres	<ul style="list-style-type: none"> • Available staff: extra person during home visit when needed (44%), more than one person on duty (30%) • Reception design with glass barrier (86%), view to entrance (62%) and waiting rooms (72%) • Consulting room setup: alternative exit (59%), quick entrance/exit for staff (46%), patient not sitting between clinician and door (29%) • Electronic Safety systems: alarm on medical radio network (74%), automatic door lock (54%), portable alarm (28%), CCTV camera (28%), ... • Training (40%) • Reporting: Monitor and follow up of Violence episodes (75%) • No reporting of number of violent incidents • 98% response rate • No results on effectivity • Application of measures give indication on perceived usefulness of recommendations and feasibility of recommendations 		
Nau, 2009 (47)	63 nursing students attending	Level 5 Very Low	Longitudinal pre- and post test study	<ul style="list-style-type: none"> • 3 days training course 	<ul style="list-style-type: none"> • Confidence in coping with 	<ul style="list-style-type: none"> • Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (Very Low)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	training course, Germany		The development and testing of a training course in aggression for nursing students		<ul style="list-style-type: none"> patient aggression 10 item scale no results on actual performance in health care settings 	<ul style="list-style-type: none"> Training should be seen as a valuable initial step in developing aggression related requirements
Schat, 2003 (36)	Health care setting 225 employees in health care	Level 5 Very Low	organizational support: reducing adverse consequences of workplace aggression Survey, moderated multiple regression	secondary prevention: moderating effect of organizational support: instrumental support (e.g. support from co-workers) and informational support (e.g. training) on negative consequences of workplace aggression and violence	<ul style="list-style-type: none"> fear of future violence emotional well-being somatic health scale job related affect job neglect 	<ul style="list-style-type: none"> instrumental support: positive effect on variance of (3%-6%) : emotional well-being, somatic health, job related affect. No effect on fear of future violence and job neglect. (Very Low) information support: positive effect on variance of (3%-6%) emotional well-being, no effect on other outcomes. (Very Low) no effect on: fear of future violence and job neglect
Chris Ifediora, 2015 (24)	General Practice Australia 300 doctors of National Home Doctors Service after hours house call services GP	not applicable	Survey: exploring the safety measures by doctors on after-hours house call services	<ul style="list-style-type: none"> No study of impact on violence incidents 57% response rate Safety measures by doctors on after-hours call services: <ul style="list-style-type: none"> overall 43% of doctors adopted protection measures while on after-hour house calls use of chaperones/security personnel: 34% dependence on surgery policies such as vetting and blacklisting risky patients, documenting doctor's destinations: 31% de-escalation or self-defence techniques: 19% panic buttons:7% personal alarms:6% 		
Hills, 2013 (48)	Australia, clinical medical practice,	not applicable	Cross-sectional study, self report survey of	No report on effectivity of measure Implementation of recommendations: 1. policies, protocols for aggression prevention and management: 66%		

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	9449 doctors of which 3515 GPs		implementation of 12 prevention and minimisation actions MABEL survey	2. warning signs in reception: 3. alerts to high risks of aggression: 4. restricting or withdrawing access to services for 5. incident reporting and follow up: 6. Education & training: 7. Alarms : 8. Clinician escape: 9. optimized lighting, noise level, comfort and waiting time in waiting area: 10. patient access restriction: 11. Building security system: alarm, camera, ...: 12. safety measures for after-hours on-call work or home visits:	49% 52% 68% 53% 47% 23% 52% 62% 70% 34%	aggressive persons: 45%
Geoffrion, 2015 (34)	1141 healthcare workers and law enforcers, Canada GEN	not applicable	Survey : Individual and organizational predictors of trivialization of workplace violence among healthcare workers and law enforcers.		<ul style="list-style-type: none"> normalization of violence as being “part of the job” taboo: avoiding open discussion, fear of being stigmatized as incompetent 	<ul style="list-style-type: none"> discussion on underreporting Individual factors in healthcare: <ul style="list-style-type: none"> men are more likely than women to consider WPV as part of the job (34% versus 23%) and perceived a taboo (54% vs 42%) Staff with more than 15 years of work experience are more likely to tolerate WPV as part of the job Organizational factors: <ul style="list-style-type: none"> colleague and employer support, training, zero tolerance policy contribute to normalization of violence but decrease the likelihood of taboo

Table 2: Summary of selected qualitative studies
GRADE-CERQual assessment

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie, 2013 (49)	3 Emergency Departments US 80 employees ED	Medium	Implementation and Evaluation of a sustainable comprehensive department-based ED violence prevention program. Action research principle: academic researchers partner with clinicians and collaboration with stakeholders	<ul style="list-style-type: none"> WPV policies and procedures: e.g. risk assessment, recordkeeping, response to violent events. WPV education Environmental changes: e.g. panic buttons, lock doors, cameras 	<ul style="list-style-type: none"> Impact on violence rates was not reported Program fidelity: Variable success in institutionalizing and sustaining intervention subcomponents. Mixed overall evaluation of program by employees: <ul style="list-style-type: none"> Employees rated the program as moderately beneficial. Surveillance and monitoring environmental changes, education and post incident care were rated as very important Policies and procedures were rated as important Managers and educators program evaluation: <ul style="list-style-type: none"> Most important components were : surveillance, environmental changes, class room training and post incident-care. WPV assessment screening at triage for all patients was evaluated as least effective There was a low participation level of physicians. Underreporting of violent events
Henson, 2010 (18)	Emergency Departments Situational Crime Prevention in Emergency Departments ED	Medium	Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory	<ul style="list-style-type: none"> Increase the Effort of criminal activity: e.g. secure entrances/exits, metal detectors Increase the Risks of getting caught: e.g. install CCTV cameras Reduce the Rewards of criminal activity: e.g. reduce the amount of prescription drugs carried by staff 	<p>In many EDs these interventions are partially implemented based upon risk assessment and prevention rationale. A systematic test of the proposed prevention techniques is not performed.</p> <p>Remark:</p> <ol style="list-style-type: none"> Situational crime theory is based on rational choice however, violence in healthcare is mostly impulsive and unplanned. To deny access to ED if patient is drunk or intoxicated is in conflict with the patients

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				<ul style="list-style-type: none"> Reduce Provocations: e.g. appropriate waiting areas, secure and isolate volatile patients Remove excuses for disruptive and violent behaviour: e.g. clearly post rules of conduct and consequences for breaking them, streamline check –in process form, refuse admission to intoxicated visitors 	fundamental right to healthcare and the physicians duty of care.
Holloman, 2012 (50)	Emergency Psychiatry Psy	Medium	Overview of Project BETA: Best Practices in Evaluation and Treatment of Agitation: to develop guideline including all interventional aspects : triage, diagnosis, verbal de-escalation and medicine choices.	5 study workgroups <ol style="list-style-type: none"> 1. medical evaluation and triage of the agitated patient 2. psychiatric evaluation of the agitated patient 3. Verbal de-escalation of the agitated patient 4. Psychopharmacologic approaches to agitation 5. Use and avoidance of seclusion and restraint 	
Stowell, 2012(51)	Emergency Psychiatry	Medium	BETA project Psychiatric Evaluation of the Agitated Patient.	Prior to attempting de-escalation, a brief evaluation must be aimed at determining the most likely cause of agitation: <ol style="list-style-type: none"> 1. Has the patient an acute medical problem ? 2. Has the patient a delirium ? 3. Has the patient a chronic cognitive impairment that is contributing to the current state of agitation ? 4. Is the patient intoxicated or in withdrawal? 5. Is the patients agitation due to psychosis caused by a known psychiatric disorder? 6. Is the agitation due to nonpsychotic depression or anxiety disorder? 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7. Is the patient simply angry or out of control ? 8. Assess the risk of suicide and violence	
Richmond, 2012 (32)	Emergency Psychiatry	Medium	BETA project Verbal de-escalation of the agitated Patient .	The authors detail the proper foundations for appropriate training for de-escalation using the 10 domains of de-escalation:" 1. Respect the patient and your personal space: maintain at least 2 arm’s length of distance 2. Do not be provocative: avoid iatrogenic escalation. Body language and tone of voice should be congruent with what the clinician is saying. 3. Establish verbal contact: Only 1 person verbally interacts with the patient. Introduce yourself to the patient and provide orientation and reassurance, explain that you are there to keep him safe and make sure no harm comes to him or anyone else. 4. Be concise and keep it simple, use short sentences, give the patient time to process and respond. 5. Repetition is essential to successful de-escalation, repeat your message until it is heard, set limits and offer choices, listen actively to the patient and agree with his position whenever possible. 6. Identify wants and feelings: Use free information to identify wants and feelings. Listen closely to what the patient is saying use active listening and Miller’s law: you must assume that what the other person is saying is true and try to imagine what it could be true of, this makes you less judgmental and the patient will sense that you are interested in what he is saying and this will improve your relationship 7. Agree with the patient as much as possible or agree to disagree 8. Lay down the law and set clear limits: Establish basic working conditions: communicate these in a matter-of-fact way and not as a threat. This requires that both patient and clinician treat each other with respect. Limit setting must be reasonable and done in a respectful manner. Coach the patient in how to stay in control 9. Offer choices and optimism. Be assertive and propose alternatives to violence. Offer realistic things that will be perceived as acts of kindness such as blankets, drinks... Broach the subject of medication when needed and offer choices to the patient. The goal is not to sedate but to calm down. 10. Debrief the patient and staff”(32)	
Wilson, 2012 (52)	Emergency Psychiatry	Medium	Psychopharmacology of agitation	“	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			BETA project	<ol style="list-style-type: none"> 1. Pharmacologic treatment of agitation should be based on an assessment of the most likely cause for the agitation. If the agitation is from a medical condition or delirium, clinicians should first attempt to treat this underlying cause instead of simply medicating with antipsychotics or benzodiazepines. 2. Oral medications should be offered over intramuscular injections if the patient is cooperative and no medical contraindications to their use exist. 3. Antipsychotics are indicated as first-line management of acute agitation with psychosis of psychiatric origin. 4. When an antipsychotic is indicated for treatment of agitation, certain SGAs (such as olanzapine, risperidone, or ziprasodone), with good evidence to support their efficacy and lack of adverse events, are preferred over haloperidol or other FGAs. Agitation secondary to intoxication with a CNS depressant, such as alcohol, may be an exception in which haloperidol is preferred owing to few data on second-generation antipsychotics in this specific clinical scenario. 5. If haloperidol is used, clinicians should consider administering it with a benzodiazepine to reduce extrapyramidal side effects unless contraindications to use of this medication exist. “(52) 	
Price, 2012 (27)	Process of de-escalating violence and aggression excluding patients with dementia	High	Key components of de-escalation techniques Qualitative research Thematic synthesis	<p>“7 themes</p> <p>Staff skills:</p> <ol style="list-style-type: none"> 1. characteristics of effective de-escalators: open, honest, supportive, self-aware, coherent, non-judgmental and confident without being arrogant 2. maintaining personal control: calmness conveys that the member of the staff is in control of the situation whereas fear can increase anxiety, make the patient feel either unsafe either that they have gained the upper hand. 3. verbal and non verbal skills: calm, gentle, soft tone of voice <p>Process of intervening:</p> <ol style="list-style-type: none"> 4. engaging with the patient: establish a bond 5. when to intervene 6. ensuring safe conditions for de-escalations 7. Strategies for de-escalation <ul style="list-style-type: none"> ○ autonomy confirming interventions <ul style="list-style-type: none"> ○ shared problem solving ○ facilitating expression ○ offering alternatives to aggression 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
					limit setting and authoritative interventions: knowing when to exert control and implement" (27)
Morken, 2015 (53)	Emergency Primary Health Care, Norway 15 nurses and 22 physicians	Medium	Focus group study, qualitative design Dealing with workplace Violence in emergency primary care focusing on organizational factors.	organizational strategies for workplace violence prevention: 1. Minimizing the risk of working alone: a. Having an efficient alarm system with adequate response time to summon someone. b. Regular turning up of colleague. 2. Being prepared: obtain information prior to the consultation, take precautions when facing warning signs, alerting colleagues or police in advance. 3. Resolving mismatch between patient expectations and services offered: e.g. clear and consistent procedures on not handing out drugs to patient and communicate these to the public. 4. Supportive manager response in follow up of a violent episode.	
Moylan, 2017(54)	General practice, Australia	not applicable	Discussion on practical measures to manage the risk of occupational violence based on guidelines from RACGP and WorkSafe Victoria. (55), (56)	multilevel response: 1. workplace design 2. policies and work practices 3. training Before consultation: 4. Is there a quick exit route ? 5. Do you have an alarm mechanism or call for assistance ? 6. Are there patient flags for previous violence ? 7. Are there other client risk factors present ? 8. Is a chaperone required ? During consultation: 9. Are warning signs of violence present ? 10. De escalate versus end consultation ? After the consultation: 11. Has the patient left safely ? 12. Are others in practice safe? 13. Documentation of event ?	
Elston, 2016 (57)	General practice 1300 GPs 13 focus groups 19 in-depth interviews	Medium	Survey, in depth interviews, focus group discussions	<ul style="list-style-type: none"> • No gender difference in overall risk of violence. • Increased risk for physical assaults within younger, male GPs . • Women were more likely to express concerns about violence . • Women consistently adopted more preventive measures than men. • Male and female GPs downplayed the impact of any violence. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
	English National Health Service UK		Gender differences in risk of violence and prevention measures.	<ul style="list-style-type: none"> Male and female GPs spoke of fear and being vulnerable. Fear and the impact of violence: differences in terms and tone between men and women GPs, higher emotional intensity in terms used by women GPs. Sexual assault and harassment: Male and female GPs are confronted with this. Women GPs explicitly suggested their professional standing protected them. Reducing risk and minimising harm: <ul style="list-style-type: none"> GPs strongly opposed to so-called "for dress medicine". GPs emphasising importance of professionalism and good communication skills to reduce risk and harm. Leaving visit schedule with someone. Check patient notes in advance. Policy adapted such that GPs use at their discretion the opportunity to be accompanied during home visits. 	
Sim, 2011 (23)	General practice, Australia	not applicable	Aggressive behaviour: Prevention and management in the general practice environment	<ul style="list-style-type: none"> Strategies to prevent aggression: <ul style="list-style-type: none"> Staff: friendly, patient focused approach, demonstrating willingness can reduce stimuli for aggressive behaviour System approach to reduce long waiting times: e.g. include emergency appointment slots, courtesy message systems to alert patients about delays, rescheduling late patients.... Management of aggression: <ul style="list-style-type: none"> Recognizing aggressive behaviour. De-escalating early aggression. Limit setting and follow up of incidents. Use of verbal or written behaviour contracts. System approach by applying the plan-do-check act approach. Establish a roadmap to follow when faced with aggressive behaviour. 	
Magin, 2010 (58)	General practice, Australia practice receptionists	medium	Semi-structured interviews Experiences and perceptions of GP receptionists with Perspex and lockdown system.	<ul style="list-style-type: none"> Perspex and lockdown system implemented or not implemented 	<p>Experiences and perceptions of GP receptionists:</p> <ul style="list-style-type: none"> positive perception about the safety measures for reducing risks concern to compromise the feeling of a practice being patient centred by alienating patients from staff and paradoxically increasing the levels of patient violence and staff fearfulness responders from low prevalence practices did not see the need for these measures

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Magin, 2008 (19)	General practice, Australia GP	Medium	Focus group discussions (18GPs) and questionnaire (154 GPs) Underlying and proximate causes of violence	<ul style="list-style-type: none"> risk factors: see discussion implementation of overt measures to deter violence such as security guards or barricades between staff and patients might impair doctor-patient trust and antagonize therapeutic relationships with mutual suspicion and misunderstanding spiralling into violence 	
Magin, 2007 (59)	General practice, Australia	not applicable	Occupational violence in general practice	<ul style="list-style-type: none"> risk factors: see discussion planning and training referral of patients to hospitals or other public facilities during out of hour service selective restriction of practice is perceived to compromise the equality of access to care principle and may lead to stigmatisation and discrimination RACGP recommendations summary of recommendation(55) RACGP recognises as well as GPs right to feel and be safe as the willingness of the GP to take care of people who may have a propensity for violence rather than the zero tolerance policy. 	
Naish, 2002 (35)	General Practice London	Medium	30 interviews and 5 focus groups (44 people)	<p>Strategies for incident management and team organization:</p> <ul style="list-style-type: none"> Immediate response: <ul style="list-style-type: none"> Containment and cooperation . Aimed at managing immediate incident, preventing escalation and preserving patient-staff relationship Medium term strategies: <ul style="list-style-type: none"> What lessons can a team learn from an aggressive incident? Adequate incident recording mechanism with agreed threshold for reporting and good support system with opportunities for individual and team debriefing. Long term strategies: <ul style="list-style-type: none"> Improved security for protection of staff , balanced with a welcoming environment for patients. Communication skills training and improved whole team communication Arrange primary care team specific workshops to review experiences , identify systematic weaknesses and formulate solutions on an inclusive multidisciplinary basis. Collective formulation of protocols for managing threatening encounters 	

Table 3: Summary of Reviews and Systematic Reviews

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Calow, 2016 (60)	Emergency Department nursing ED, Psy inpatient setting	Level 3 Low	Review: Evaluation of the use of risk assessment tools in the Emergency Department 13 articles included no studies with RCT design	<ul style="list-style-type: none"> Use of risk assessment tools in Emergency Department Does the use of an aggression risk assessment tool reduce the future risk of violence towards the health care worker ? STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing BVC: Brøset Violence Checklist inpatient setting, psychiatric units: 6-item tool confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> prediction of short term violence reduction of violence 	<ul style="list-style-type: none"> Lack of high quality studies Most prevalent risk assessment tools with good validity and sensitivity for early identification of aggressive behaviour: STAMP and BVC STAMP violence assessment framework has been shown to be an effective tool in early identification of violent behaviour in ED setting (moderate) BVC is the most prevalent tool in inpatient setting and shows best validity and reliability. (moderate) there was no reporting on reduction of violence
Kynoch, 2011 (61)	Acute hospital setting nursing ICU ED	Level 3 Low	Systematic Review Interventions for preventing and managing aggressive patients in acute hospital setting 1990-2007 10 articles included no studies with RCT design	<ul style="list-style-type: none"> staff training pharmacological treatment mechanical restraint 	<ul style="list-style-type: none"> patient aggression staff injuries, staff confidence, knowledge, attitude, stress early detection of aggressive behaviour 	<ul style="list-style-type: none"> Lack of high quality studies Training results in increased knowledge, skills and confidence to manage aggressive situations. (Low) Medication helps to reduce the incidence of aggressive behaviour in patients in the acute setting (Moderate) in acute care setting mechanical restraints have minimal complications when used for short periods of time (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2013(62)	front-line healthcare worker nursing, US	Level 3 Low	Literature Review: Workplace violence prevention: improving front-line healthcare worker safety.	<ul style="list-style-type: none"> Flagging patient with history of violence against staff Training: e.g. web based NIOSH training Workplace Violence Prevention Program: WVPP 	<ul style="list-style-type: none"> reduction in assault by the patient 	<ul style="list-style-type: none"> Lack of high quality studies 90% reduction in assaults by flagging high risk patients in veteran health care (Moderate) Training is necessary but there is little evidence on impact Complex and mixed findings on effect of WVPP
Runyan, 2000 (30)	Medical Health Care	Level 3 Low	Systematic Review <ul style="list-style-type: none"> studies included were mainly pre- and post - test study design No studies with RCT design 	Behavioural interventions Administrative interventions	<ul style="list-style-type: none"> 41 papers: Sensible Recommended Interventions but no hard data 9 articles reported results of intervention evaluations 	<ul style="list-style-type: none"> Haddon Matrix overall, the research designs employed were weak and the results inconclusive. None used experimental designs Results: <ul style="list-style-type: none"> decline in frequency of assaults after implementation of a peer help program for assaulted staff (Low) unavailability of debriefing counselling was associated with increased reports of post traumatic stress (Moderate). training program: conflicting evidence : <ul style="list-style-type: none"> psychiatric setting: training in aggression control technique: likelihood of assault 3% versus 37% in non-trained, but potential bias associated with decision to be trained (Low) no significant differences in assault related injuries

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						between trained and untrained group (Low) <ul style="list-style-type: none"> psychiatric setting : no significant difference in number of injuries reported from pre- and post test 4 day training (Low) flagging patients with repeated history of violent events 90% reduction in assault by high risk patients in Veterans Administration hospital (Moderate) quality management approach: improvements in inpatient violence.: e.g. 40% reduction in mealtime incidents after changes in lunchroom procedures. (Low)
Price , 2015 (26)	mental health setting mainly nurses Psy	Level 2 Moderate	Systematic Review: 38 relevant studies Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression <ul style="list-style-type: none"> 23 uncontrolled cohort studies 12 controlled cohort studies 3 case control studies 	<ul style="list-style-type: none"> training on violence including de-escalation technique 	<ul style="list-style-type: none"> cognitive outcome affective outcome behaviour change reduced escalations, reduced assault rates, reduced usage containment 	<ul style="list-style-type: none"> Quality of studies moderate to weak Cognitive outcome: enhanced de-escalation knowledge gain (ES: 0.91, 1.13, 1.39), (Moderate) Affective outcome: increased confidence to manage aggression, ES: <0.2, 0.76, 1.04 (Moderate). No evidence on subjective anxiety regulation. Skills: improved de-escalation performance: ES >0.8 (Moderate) Assault rates: mixed outcomes: 3 studies with reduced risk of assault, 2 studies with no significant effect.

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Reference	Setting	Level/Grade	Study design	Intervention	Outcome	Results (Grade)
			<ul style="list-style-type: none"> No studies with RCT design 			<ul style="list-style-type: none"> Incidence of aggression: mixed outcomes with increases in aggression possibly due to increased reporting. Significant reduction in incident rates measured at ward level: ES 0.64 Injuries: mixed outcomes. Positive effects in reducing injuries at ward level, not at individual staff level: ES 1.13 Containment: reduced use of physical restraint (Low). non significant reduction in use of rapid tranquilisation (Low), no effect on supply of extra medication (Low) Organisational: reduction in lost workdays: ES 1.47 (Moderate)
Wassell, 2009 (63)	GEN Retail industry	Level 3 Low	Systematic Review Workplace Violence intervention effectiveness	<ul style="list-style-type: none"> interventions in health care and retail industry 		Although the article provides a good overview of the published literature, a more in-depth reporting of the relevant underlying studies is provided in the current systematic review
Morphet, 2018 (64)	GEN		<ul style="list-style-type: none"> Scoping Review Prevention and management of occupational violence and aggression in health care 	<ul style="list-style-type: none"> environmental risk management consumer risk assessment staff education 	<ul style="list-style-type: none"> 20 selected articles 	A more in-depth reporting of the relevant underlying studies is provided in the current systematic review.

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7.	In front of risk of violence, the safety of patients, staff and others patients should be presumed.
				8.	If restraint and seclusion are necessary, not only proper monitoring but the use of quality indicators should be also undertaken.
				9.	In the case of physical restraint, vigilant documented monitoring should be mandatory. Vital signs should be measured every 15 min for 60 min and then every 30 min for 4 h or until awake.
				10.	Physical restraint should be removed as soon as the patient is assessed to not to be dangerous anymore for him/herself and/or others.
				11.	Non-invasive treatments should be preferred over invasive treatments whenever possible.
				12.	Agitated patients should be as much as possible involved in both the selection of the type and the route of administration of any medication.
				13.	The main goal of pharmacological treatment should be to rapidly calm the agitated patient without over-sedation.
				14.	When planning involuntary pharmacological treatment team consent should be reached and the action carefully prepared.
				15.	Oral medications, including solutions and dissolving tablets, should be preferred to intramuscular route in mildly agitated patient.
				16.	A rapid onset of the effect and the reliability of delivery are the two most important factors to consider in choosing a route of administration for the treatment of severe agitation.
				17.	In the case of agitation secondary to alcohol withdrawal treatment with benzodiazepines should be preferred over treatment with antipsychotics.
				18.	In the case of agitation associated with alcohol intoxication, treatment with antipsychotics should be preferred over treatment with benzodiazepines.
				19.	In mild-to-moderate agitation, and when rapid effects of medication are needed, inhaled formulations of antipsychotics may be considered.
				20.	The concomitant use of intramuscular olanzapine and benzodiazepines should be avoided, due to the possible dangerous effects induced by the interaction of the two medications in combination (hypotension, bradycardia, and respiratory depression).
				21.	Intravenous treatment should be avoided except in cases where there is no alternative.

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
wright, 2003 (20)	General practice, UK	Medium	Systematic Review Prevalence and management of violence in primary care	22. Elderly agitated patients should be treated with lower doses: usually between a quarter and a half of the standard adult dose. (31) “	<ul style="list-style-type: none"> • Management of violence in Primary care should focus on structural risk factors and interaction at individual level between patient and clinician • Establish a collaborative practice approach. • Be aware of the specific risks for verbal abuse and threats of violence towards the receptionists. • Risk factors are not static but vary according to time, place and situation. • GPs should use their knowledge of the patient to form part of risk assessment. • Perceived risk of violence can exceed the real absolute risk. Balance the risk of excluding patients from primary care versus staff safety <p>Do:</p> <ul style="list-style-type: none"> • Provide panic alarms. • Use a critical incident recording system. • Ensure that waiting area can be seen from the reception desk. • Provide a means of escape that does not involve the path of the patient. • Consult with another team member if conflict is anticipated. • Call the police if an abusive situation seems likely to become violent. • Reflect on one's own behaviour after each critical incident. • Remove a patient from the list only as a last resort. • Encourage all team members to 'own' the potential problem of violence. <p>Do Not:</p> <ul style="list-style-type: none"> • Use grilles, barriers, or glass screens inappropriately. • Leave it to someone else to attend to the problem. • Use physical force to restrain. • Always see yourself as 'right' and the other party as 'wrong" (20)
Phillips, 2016 (21)	Health Care different settings, US	Medium	Review article <ul style="list-style-type: none"> • prevalence of WPV type II • Non hospital setting • Hospital setting • Barriers to reporting • Risk Factors 	<ul style="list-style-type: none"> • Although metal detectors may theoretically mitigate violence in the health care workplace, there is no concrete evidence to support this expectation • Lack of supporting evidence on efficacy of preventive measures • Difficulty in designing experiments to test hypothetical interventions • Multifaceted, multidisciplinary approach is necessary and any prevention program requires individualization and customization. • "Recommendations that have been proposed: 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			<ul style="list-style-type: none"> metal detectors guidelines potential solutions 	<ul style="list-style-type: none"> training in de-escalation techniques and training in self-defence target hardening of infrastructure: security cameras, fences, metal detectors, hiring of guards health care organizations: improve staffing levels during busy periods to reduce crowding and wait times, decrease worker turnover and provide adequate security and mental health personnel on site reporting and redress: verbal assault has been shown to be a risk factor for battery. "The broken window principle": a criminal justice theory that apathy toward low-level crimes creates a neighborhood conducive to more serious crime also applies to workplace violence. "Zero tolerance policy" may prevent escalation." (21) 	
Wax, 2016 (65)	health care US	not applicable	Review Workplace Violence in Health Care: It's Not "Part of the Job".	<ul style="list-style-type: none"> Prevalence: health care workers comprise only 3% of US workforce but experience 60% of all workplace assaults Types of workplace violence Contributors to WPV: see discussion on risk factors Consequences of WPV in healthcare Guideline summary: OSHA(66) Responding to active shooter incident: "run, hide, fight" approach. The human, societal and economic costs of health care WPV are enormous and unacceptable. There are opportunities for professional physician organizations to establish clear policy statements on WPV, to support education on WPV and to assist collaborative state legislative efforts . 	
Gillespie, 2010 (22)	health care workers US	Medium	literature review: Workplace Violence in Healthcare Settings: Risk Factors and Protective Strategies	<ul style="list-style-type: none"> Environmental risk factors: controlled access to patient areas, reduced wait times, security presence, escorting workers to vehicle, security presence, video monitors, cell phone or personal alarm, Organizational policies, zero-tolerance policy. After violent event: support from co-workers, management, debriefing, professional counselling, re-assigning patients when feasible General practitioner: documentation of after hours destination, no house calls to unfamiliar patients. Instructing unknown patients or patients with history of violence to seek health care with a different provider Communication of location at regular intervals with a unit coordinator and a plan to be activated on failure to do so. 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Robson, 2007 (38)	general OHSAS system effectiveness different industrial sectors	Medium	systematic review The effectiveness of occupational health and safety management system interventions 13 selected studies	<ul style="list-style-type: none"> • Violence-prevention training on hiring and regular updates ; including recognizing stress in oneself or in patients, de-escalation techniques. • Effective violence-prevention program • Limiting visitor access to 2 persons <hr/> <ul style="list-style-type: none"> • See discussion • Relatively small quantity of published peer reviewed evidence involving occupational health and safety managements system interventions • Synthesis of evidence showed mostly favourable results, there were a few null findings but no findings of negative effects. • All but one of the studies included had moderate methodological limitations. • Despite the generally positive results on effectiveness of occupational health and safety managements system interventions, the evidence is insufficient to make recommendations either in favour or against . 	

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Overview of relevant guidelines

Table 4 Guidelines

		Country
Occupational Safety and Health Administration, 2016 (66)	Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers	US
Wiskow, 2003(67)	Guidelines on workplace violence in health sector	comparison of different guidelines
The Royal Australian College of General Practitioners, 2015 (55)	General practice – A safe place A guide for the prevention and management of patient-initiated violence	Australia
WorksafeVictoria, 2017 (56)	Prevention and management of violence and aggression in health services	Australia
NICE, 2015 (68)	Violence and aggression: short-term management in mental health, health and community settings NICE, 2015	UK
FOD Binnenlandse Zaken & FOD Volksgezondheid, 2009(69)	een veilige dokterspraktijk	Belgium
Een veilige dokterspraktijk, 2017(70)	Veiligheid voor huisartsen , toolbox 1	

Table 5 risk factors that increase the risk of occupational violence

(54), (62), (53), (31), (71), (23), (65), (57), (19), (34), (4),(21),(59),(20),(22),(72)

Workplace design	<ul style="list-style-type: none"> • Poor delineation between staff-only area and patient area • Lack of controls in accessing staff-only and patient areas • Overcrowded, uncomfortable or noisy waiting rooms • Poor access to exits, toilets and amenities • Poor lighting, blind spots without surveillance • Unsecured furnishings that can be used as weapons
Policies and Work practices	<ul style="list-style-type: none"> • Increased waiting times • Poor customer services from staff • Deficit in staffing levels or inadequate skills mix • Working alone • Lack of violence-prevention programs • Lack of staff empowerment and shared governance • Lack of follow up of violent episodes by management • Poor safety culture: “broken window principle” • Ineffective mechanisms to warn and ultimately deny service to patients with repeated behaviours of concern • Lack of staff training in de-escalation techniques, • Lack of staff training in etiology and treatment of various pathologies associated with violent behaviour • Use of physical restraints • Mismatch between expectations and services offered: e.g. demands for classified drugs • Presence of drugs, cash or valuable items in the office • Presence of weapons • Refusal to provide a prescription or a sickness or disability certificate • On-call shifts/house visits
Patient factors	<ul style="list-style-type: none"> • Current illness with physiological imbalances or disturbances: <ul style="list-style-type: none"> ○ head trauma ○ encephalitis, meningitis, infection ○ encephalopathy ○ metabolic derangement: hyponatremia, hypocalcemia, hypoglycemia ○ hypoxia ○ thyroid disease ○ seizure (postictal) ○ exposure to environmental toxins ○ toxic levels of medications • Active intoxication, substance dependence, misuse or abuse • Psychosocial stressors • Previous poor experiences with healthcare services • Past history of violence • Psychiatric disorder • Personality, interpersonal style of control or dominance • Frustration , perception not being respected, not being listened to or being treated unfairly • Stress, agitation • Loss of situational control

	<ul style="list-style-type: none"> • Unexpected or high costs of health care • Complex family relationships
Physicians factors	<ul style="list-style-type: none"> • Being unprepared • Education and training: being aware of own body language, knowing how to de-escalate, knowing how to escape • Medical skills • Communication skills • Less years of experience • Physicians own emotions, anger, anxiety, countertransference • Overworked, stressed • Interpersonal style: e.g. assertive style by the physician may challenge the patient's sense of dominance and lead to discomfort and frustration • Gender: no difference in overall risk of violence, increased risk within younger, male GPs for physical assaults • Vulnerability in being a source of risk with respect to legal or licensing matters e.g. with information to third parties beyond direct patient care • Vulnerability : where does the duty of care end in the face of potential violence • Personality traits with increased risk: low agreeableness, high neuroticism, high negative affect, low extroversion, low conscientiousness, low self-esteem
Societal causes / Social context	<ul style="list-style-type: none"> • Poverty, unemployment and social dislocation • Reduced respect for authority, patients are having a greater sense of entitlement than in past and as a consequence frustration in not getting response to demands potentially leads to violence • "Bowling for Columbine effect": spiral of fearfulness, suspicion leading to pre-emptive defensiveness, confrontation and ultimately a greater risk of violence • Population density • Language barriers • Cultural differences

References

1. Hills DJ, Joyce CM, Humphreys JS. A national study of workplace aggression in Australian clinical medical practice. *Med J Aust* [Internet]. 2012;197(6):336–40. Available from: <https://www.mja.com.au/journal/2012/197/6/national-study-workplace-aggression-australian-clinical-medical-practice>
2. Elston MA, Gabe J. Violence in general practice: A gendered risk? *Sociol Heal Illn*. 2016;38(3):426–41.
3. Demeur V, Devos S, Jans E. Agressie tegen de huisarts: De arts in nood. Het profiel van de kwetsbare huisarts. KU LEUVEN; 2017.
4. Vorderwülbecke F, Feistle M, Mehring M, Schneider A, Linde K. Aggression and Violence Against Primary Care Physicians—a Nationwide Questionnaire Survey. *Dtsch Arztebl Int*. 2015;112(10):159–65.
5. Nikathil S, Olausson A, Gocentas RA, Symons E, Mitra B. Review article: Workplace violence in the emergency department: A systematic review and meta analysis. *Emerg Med Australas* [Internet]. 2017;29(3):265–75. Available from: <http://doi.wiley.com/10.1111/1742-6723.12761>
6. Kowalenko T, Cunningham R, Sachs CJ, Gore R, Barata IA, Gates D, et al. Workplace violence in emergency medicine: Current knowledge and future directions. *J Emerg Med* [Internet]. Elsevier Ltd; 2012;43(3):523–31. Available from: <http://dx.doi.org/10.1016/j.jemermed.2012.02.056>
7. Arnetz, Judith E, Lydia H, Russell J. Preventing patient-to-worker violence in hospitals: outcome of a randomized controlled intervention. 59(1):18–27.
8. Moher D, Liberati A, Tetzlaff J, Altman DG, Altman D, Antes G, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;6(7).
9. Higgins JPT GS. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0* The Cochrane Collaboration [Internet]. 2011. Available from: www.handbook.cochrane.org
10. OCEBM Levels of Evidence Working Group, Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, et al. *The Oxford 2011 Levels of Evidence 2*. 2011; Available from: <http://www.cebm.net/index.aspx?o=1025>
11. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schunemann HJ. GRADE: What is “quality of evidence” and why is it important to clinicians? *Bmj*. 2008;336(may):995-8-995-8.
12. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;336(1):924(3).
13. Lewin S, Booth A, Glenton C, Munthe-Kaas H, Rashidian A, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: Introduction to the series. 2018;13(Suppl 1):1–10.
14. Arnetz JE, Hamblin L, Russell J, Upfal MJ, Luborsky M, Janisse J, et al. Preventing Patient-to-Worker Violence in Hospitals: Outcome of a Randomized Controlled Intervention. *J Occup Environ Med*. 2017;59(1):18–27.
15. Lipscomb J, Mcphaul K, Rosen J, Brown JG, Choi M, Soeken K, et al. Violence Prevention in the Mental Health Setting: The New York State Experience. 2006;38:96–117.
16. Mohr DC, Warren N, Hodgson MJ, Drummond DJ. Assault rates and implementation of a workplace violence prevention program in the veterans health care administration. *J Occup Environ Med*. 2011;53(5):511–6.
17. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy : a repeated cross-sectional study. *BMC Health Serv Res*. 2012;
18. Henson B. Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory. *Violence Vict* [Internet]. 2010;25(4):553–65. Available from: <http://openurl.ingenta.com/content/xref?genre=article&issn=0886-6708&volume=25&issue=4&spage=553>

19. Magin P, Adams J, Joy E, Ireland M, Heaney S, Darab S. Violence in general practice: Perceptions of cause and implications for safety. *Can Fam Physician*. 2008;54(9):1278–84.
20. Wright NMJ, Dixon CAJ, Tompkins CNE. Managing violence in primary care: An evidence-based approach. *Br J Gen Pract*. 2003;53(492):557–62.
21. Phillips JP. Workplace Violence against Health Care Workers in the United States. *N Engl J Med* [Internet]. 2016;374(17):1661–9. Available from: <http://www.nejm.org/doi/10.1056/NEJMra1501998>
22. Gillespie GL, Gates DM, Miller M, Howard PK. Workplace violence in healthcare settings: risk factors and protective strategies. *Rehabil Nurs*. 2010;35(5):177–84.
23. Sim MG, Wain T, Khong E. Aggressive behaviour: Prevention and management in the general practice environment. *Aust Fam Physician*. 2011;40(11):866–72.
24. Ifediora C. Exploring the safety measures by doctors on after-hours house call services. *Australas Med J*. 2015;8(7):239–46.
25. Morken T, Johansen IH. Safety measures to prevent workplace violence in emergency primary care centres – a cross-sectional study. *BMC Health Serv Res* [Internet]. *BMC Health Services Research*; 2013;13(1):1. Available from: *BMC Health Services Research*
26. Price O, Baker J, Bee P, Lovell K. Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry* [Internet]. 2015;206(6):447–55. Available from: <http://bjp.rcpsych.org/cgi/doi/10.1192/bjp.bp.114.144576>
27. Price O, Baker J. Key components of de-escalation techniques: A thematic synthesis. *Int J Ment Health Nurs*. 2012;21(4):310–9.
28. Saragoza P, White SG. Workplace Violence: Practical Considerations for Mental Health Professionals in Consultation, Assessment, and Management of Risk. *Psychiatr Clin North Am* [Internet]. Elsevier Inc; 2016;39(4):599–610. Available from: <http://dx.doi.org/10.1016/j.psc.2016.07.007>
29. Abderhalden C, Needham I, Dassen T, Halfens R, Haug HJ, Fischer JE. Structured risk assessment and violence in acute psychiatric wards: Randomised controlled trial. *Br J Psychiatry*. 2008;193(1):44–50.
30. Runyan CW, Zakocs RC, Zwerling C. Administrative and behavioral interventions for workplace violence prevention. *Am J Prev Med* [Internet]. 2000;18(4):116–27. Available from: <http://www.sciencedirect.com/science/article/pii/S0749379700001471>
31. Garriga M, Pacchiarotti I, Kasper S, Zeller SL, Allen MH, Vázquez G, et al. Assessment and management of agitation in psychiatry: Expert consensus. *World J Biol Psychiatry*. 2016;17(2):86–128.
32. Richmond J, Berlin J, Fishkind A, Holloman G, Zeller S, Wilson M, et al. Verbal De-escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. *West J Emerg Med* [Internet]. 2012;13(1):17–25. Available from: <http://www.escholarship.org/uc/item/55g994m6>
33. Kohlrieser G. Hostage at the table. *Jossy-Bass*; 2006.
34. Geoffrion S, Lanctôt N, Marchand A, Boyer R, Guay S. Predictors of trivialization of workplace violence among healthcare workers and law enforcers. *J Threat Assess Manag* [Internet]. 2015;2(3–4):195–213. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/tam0000048>
35. Naish J, Carter YH, Gray RW, Stevens T, Tissier JM, Gantley MM. Brief encounters of aggression and violence in primary care: a team approach to coping strategies. *Fam Pract* [Internet]. 2002;19(5):504–10. Available from: <http://fampra.oxfordjournals.org/content/19/5/504.abstract%5Cnhttp://fampra.oxfordjournals.org/content/19/5/504.full.pdf>
36. Schat ACH, Kelloway EK. Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. *J Occup Health Psychol* [Internet]. 2003;8(2):110–22. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/1076->

- 8998.8.2.110
37. Magnavita N. Violence Prevention in a Small-scale Psychiatric Unit: Program Planning and Evaluation. *Int J Occup Environ Health*. 2011;17(4):336–44.
 38. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of occupational health and safety management system interventions: A systematic review. *Saf Sci*. 2007;45(3):329–53.
 39. James S, Cawood C. *Violence Assessment and Intervention: The Practitioner's Handbook*, Second Edition. 2009. 377 p.
 40. Runyan CW. Moving forward with research on the prevention of violence against workers. *Am J Prev Med*. 2001;20(2):169–72.
 41. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical intervention programme for dealing with violence towards health care workers. *J Adv Nurs*. 2000;31(3):668–80.
 42. Arnetz JE, Hamblin L, Ager J, Aranyos D, Upfal MJ, Luborsky M, et al. Application and implementation of the hazard risk matrix to identify hospital workplaces at risk for violence. *Am J Ind Med*. 2014;57(11):1276–84.
 43. Rogers P, Miller G, Paterson B, Bonnett C, Turner P, Brett S, et al. Is breakaway training effective? Examining the evidence and the reality. *J Ment Heal Training, Educ Pract*. 2007;2(2):5–12.
 44. Hvidhjelm J, Sestoft D, Skovgaard LT, Bjorner JB. Sensitivity and specificity of the Broset Violence Checklist as predictor of violence in forensic psychiatry. *Nord J Psychiatry*. 2014;68(8):536–42.
 45. Partridge B, Affleck J. Predicting aggressive patient behaviour in a hospital emergency department: An empirical study of security officers using the Brøset Violence Checklist. *Australas Emerg Care [Internet]*. College of Emergency Nursing Australasia; 2018;21(1):31–5. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S2588994X17300039>
 46. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: A cross-sectional study. *Scand J Prim Health Care*. 2012;30(1):55–60.
 47. Nau J, Dassen T, Needham I, Halfens R. The development and testing of a training course in aggression for nursing students: A pre-and post-test study. *Nurse Educ Today [Internet]*. Elsevier Ltd; 2009;29(2):196–207. Available from: <http://dx.doi.org/10.1016/j.nedt.2008.08.011>
 48. Hills DJ, Joyce CM, Humphreys JS. Workplace aggression prevention and minimisation in Australian clinical medical practice settings - A national study. *Aust Heal Rev*. 2013;37(5):607–13.
 49. Gillespie GL, Gates DM, Mentzel T, Al-Natour A, Kowalenko T. Evaluation of a comprehensive ED violence prevention program. *J Emerg Nurs [Internet]*. Emergency Nurses Association. Published by Elsevier Inc. All rights reserved.; 2013;39(4):376–83. Available from: <http://dx.doi.org/10.1016/j.jen.2012.12.010>
 50. Holloman G, Zeller S. Overview of Project BETA: Best Practices in Evaluation and Treatment of Agitation. *West J Emerg Med [Internet]*. 2012;13(1):1–2. Available from: <http://www.escholarship.org/uc/item/4kz5387b>
 51. Stowell K, Florence P, Harman H, Glick R. Psychiatric Evaluation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA Psychiatric Evaluation Workgroup. *West J Emerg Med [Internet]*. 2012;13(1):11–6. Available from: <http://www.escholarship.org/uc/item/9t41z4rb>
 52. Wilson M, Pepper D, Currier G. The psychopharmacology of agitation: consensus statement of the American association for emergency psychiatry project. BETA psychopharmacology workgroup. *West J Emerg Med [Internet]*. 2012;13(6):536–7. Available from: <http://www.escholarship.org/uc/item/2gm874n6>
 53. Morken T, Johansen IH, Alsaker K. Dealing with workplace violence in emergency primary health care : a focus group study. *BMC Fam Pract*. 2015;1–7.
 54. Aydin B. Violence Against Practitioners in Turkey. 2009;1980–95.

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55. The Royal Australian College of General Practitioners. General practice – A safe place. A guide for the prevention and management of patient-initiated violence. [Internet]. 2015. Available from: <http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-tipsandtools.pdf>
56. WorkSafe Victoria. Prevention and management of violence and aggression in health services. 2017;(2).
57. Zhao S, Qu L, Liu H, Gao L, Jiao M, Liu J, et al. Coping with Workplace Violence against General Practitioners and Nurses in Heilongjiang Province, China: Social Supports and Prevention Strategies. *PLoS One*. 2016;11(6):1–14.
58. Magin P. General practice as a fortress. *Aust Fam Physician*. 2010;39(11).
59. Magin P, Adams J, Joy E. Occupational violence in general practice. *Aust Fam Physician*. 2007;36(11):955–7.
60. Calow N, Lewis A, Showen S, Hall N. Literature Synthesis: Patient Aggression Risk Assessment Tools in the Emergency Department. *J Emerg Nurs* [Internet]. Emergency Nurses Association; 2016;42(1):19–24. Available from: <http://dx.doi.org/10.1016/j.jen.2015.01.023>
61. Kynoch K, Wu CJ, Chang AM. Interventions for preventing and managing aggressive patients admitted to an acute hospital setting: A systematic review. *Worldviews Evidence-Based Nurs*. 2011;8(2):76–86.
62. Lipscomb JA, El Ghaziri M. Workplace Violence Prevention: Improving Front-Line Health-Care Worker and Patient Safety. *NEW Solut A J Environ Occup Heal Policy* [Internet]. 2013;23(2):297–313. Available from: <http://journals.sagepub.com/doi/10.2190/NS.23.2.f>
63. Wassell JT. Workplace violence intervention effectiveness: A systematic literature review. *Saf Sci* [Internet]. Elsevier Ltd; 2009;47(8):1049–55. Available from: <http://dx.doi.org/10.1016/j.ssci.2008.12.001>
64. Morphet J, Griffiths D, Beattie J, Velasquez Reyes D, Innes K. Prevention and management of occupational violence and aggression in healthcare: A scoping review. *Collegian* [Internet]. Australian College of Nursing Ltd; 2018; Available from: <https://doi.org/10.1016/j.colegn.2018.04.003>
65. Wax JR, Pinette MG, Cartin A. Workplace Violence in Health Care-It’s Not “Part of the Job”. *Obstet Gynecol Surv* [Internet]. 2016;71(7):427–34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27436177>
66. Occupational Safety and Health Administration. Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers. 2016;1–53. Available from: <https://www.osha.gov/Publications/osha3148.pdf>
67. Wiskow C. Guidelines on Workplace Violence in the Health Sector, Comparison of major known national guidelines and strategies. *Strategies*. 2003;
68. NICE. Violence and Aggression, Short-Term Management in Mental Health, Health and Community Settings: Updated edition [Internet]. Violence and Aggression: Short-Term Management in Mental Health, Health and Community Settings: Updated edition. 2015. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26180871>
69. FOD Binnenlandse Zaken, FOD Volksgezondheid. Veiligheid voor huisartsen. 2009; Available from: <http://www.veiligheidvanartsen.be/>
70. Een veilige dokterspraktijk [Internet]. 2017. Available from: <https://www.besafe.be/publicaties/een-veilige-dokterspraktijk>
71. Daffern M, Day A, Cookson A. Implications for the prevention of aggressive behavior within psychiatric hospitals drawn from interpersonal communication theory. *Int J Offender Ther Comp Criminol*. 2012;56(3):401–19.
72. Landau SF, Bendalak J, Amitay G, Marcus O. Factors related to negative feelings experienced by emergency department patients and accompanying persons: An Israeli study. *Isr J Health Policy Res*. *Israel Journal of Health Policy Research*; 2018;7(1):1–9.

Appendix

Details of search strategy						
I preliminary search 3-6 February 2018						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
1	pubmed 3 Feb. 2018	((("physician"[Title/Abstract] OR "general practitioner"[Title/Abstract]) OR "doctor"[Title/Abstract]) AND "aggression"[Title/Abstract])	153	44		
2	pubmed 3 Feb 2018	((("physician"[Title] OR "general practitioner"[Title]) OR "doctor"[Title]) AND "violence"[Title])	79	17		
3	embase 4 Feb 2018	'physician':ab,ti OR 'general practitioner':ab,ti) AND 'aggression':ab,ti	145			
4	embase 6 Feb 2018	Query 'physician'/mj AND 'violence'/mj NOT 'domestic violence'/exp Mapped terms "domestic violence" mapped to 'domestic violence', term is exploded articles and review	68			
5	TRIP 4 Feb 2018	physician violence	261	2		
6	Cochrane 4 Feb 2018	"workplace" in Title, Abstract, Keywords and violence in Title, Abstract, Keywords in Other Reviews'	17	0	0	
7	ebmpractice 4 Feb 2018	geweld, agressie	1	1	1	
8	crd 4 Feb 2018	Results for: (violence):TI NOT (domestic):TI NOT (partner):TI IN DARE	23	3		
	<i>subtotal</i>		747	67	46	12
II Systematic Search						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
0	pubmed 15 Feb 2018	Search (((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND prevent*[Title/Abstract] Sort by: Best Mat	53	24	8	4
1	pubmed 15 Feb 2018	((("Workplace Violence"[Mesh]) OR "Aggression"[Mesh]) AND "Health Care Sector"[Mesh])	8	8	3	3
2	pubmed 15 Feb 2018	((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND intervent*[Title/Abstract])	19	10	6-3 double =3	0

3	pubmed 15 Feb 2018	((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat])))) AND strateg*[Title/Abstract])	34	8	8-6 double= 2	0
4	pubmed 15 Feb 2018	Search (((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms])) AND Review[ptyp] AND "last 10 years"[PDat])) NOT domestic violence[MeSH Terms]) AND Review[ptyp] AND "last 10 years"[PDat])) AND prevent*[Title/Abstract]) AND Review[ptyp] AND "last 10 years"[PDat])) AND Review[ptyp] AND "last 10 years"[PDat] AND Humans[Mesh])) NOT youth[MeSH Terms]) NOT abuse, partner[MeSH Terms] Sort by: Best Match Filters: Review; published in the last 10 years; Humans	272	24	14+ 4 snowball -3 double =15	12
5	pubmed 15 Feb 2018	Search (((("General Practitioners"[Mesh]) OR "General Practice"[Mesh]) AND "Violence"[Mesh])) NOT domestic violence[MeSH Terms] Sort by: Best Match Filters: Humans; English	158	46	13-2 double =11	6
6	psycharticle 14 Feb 2018	((ti(aggression) OR ti(violence)) NOT ti(partner) NOT ti(domestic)) AND ti(physician) OR ti(doctor) OR ti(workplace)	26	22	11	3
	extra				4	4
	<i>subtotal</i>		570	142	57	32
	Total				103	44

Nederlandstalige samenvatting:

Doeltreffende interventies ter preventie van agressie tegen artsen, een systematische review

Achtergrond: internationale studies tonen aan dat agressie tegen artsen een gekend en ernstig beroepsrisico is.

Doelstelling: In kaart brengen van doeltreffende interventies ter preventie van agressie tegen artsen en meer specifiek tegen huisartsen.

Methode: Het betreft een systematische review conform de PRISMA richtlijnen.

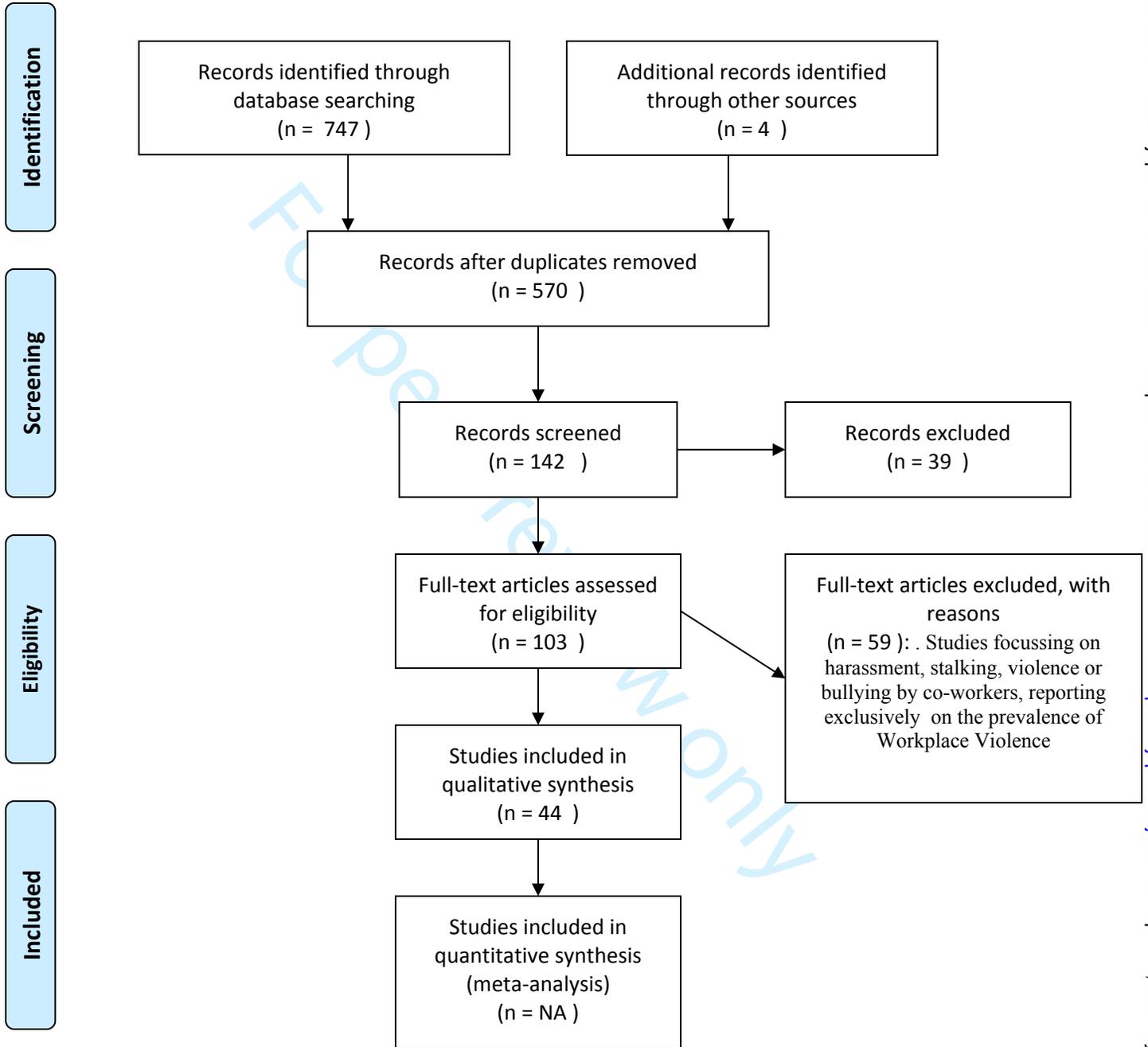
Resultaten: 44 studies werden weerhouden voor deze review. Eén RCT leverde beperkte bewijskracht dat een geïntegreerd veiligheidspreventieplan het risico op agressie doet dalen. Belangrijke risicofactoren voor geweld zijn lange wachttijden, verschillen in verwachtingspatroon bij de patiënt en de geleverde hulp, alcohol of drugsmisbruik of een psychiatrische stoornis bij de patiënt. Aanpassingen aan de werkomgeving en organisatorische maatregelen hebben als doelstelling de gekende risicofactoren te verminderen maar er is geen bewijskracht voor de effectiviteit hiervan. Eén RCT leverde bewijskracht dat een gestructureerde risico inschatting van de patiënt gecombineerd met preventiemaatregelen op maat het aantal ernstige incidenten op psychiatrische afdelingen kon doen dalen.

Het toepassing van de-escalatie technieken tijdens agressie is sterk aangeraden. Nadat een incident heeft voorgedaan is het van belang het incident te rapporteren en analyseren naar onderliggende vermijdbare oorzaken, deze analyse vormt de input voor herziening en optimalisatie van het veiligheidspreventieplan.

Discussie: Deze systematische review toonde aan dat slechts een beperkt aantal studies succesvol waren in het aantonen van effectieve interventies ter preventie van agressie tegen artsen en meer specifiek tegen huisartsen. Wanneer men tracht een RCT op te zetten in dit onderzoeksdomein zal er steeds detectie-, rapporterings- en performantiebias zijn. De auteurs menen dat een grote cohortstudie inzicht en bewijskracht kan leveren voor de effectiviteit van interventies ter preventie van agressie tegen huisartsen.



PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I ²) for each meta-analysis.	NA



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4-5 and appendix
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Tables
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Tables
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Tables 4-6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	9
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Page 2 of 2

BMJ Open

Interventions to prevent aggression against doctors: A Systematic Review

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Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Ethics, Health services research
Keywords:	aggression, general practitioner, workplace violence, interventions

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Title: Interventions to prevent aggression against doctors: A Systematic Review

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Interventions to prevent aggression against doctors, a Systematic Review

Abstract

Objective: To find out if there is evidence on interventions to prevent aggression against doctors.

Design: This systematic review searched the literature and reported in accordance with PRISMA-guidelines.

Data sources: Pubmed, Embase, TRIP, Cochrane and Psycharticle , GoogleScholar and www.guideline.gov were consulted.

Eligibility Criteria: Abstracts published in English between January 2000 and January 2018 were screened. Eligible studies focussed on prevention and risk factors of type II Workplace Violence in General Healthcare, Psychiatric departments, Emergency Departments, Emergency Primary Care, General Practice.

Data extraction and synthesis: The selected intervention studies were grouped in quantitative and qualitative studies. Systematic Reviews were reported separately. For each selected study, the design, type of intervention and key findings were analysed.

Results: 44 studies are included. One RCT provided moderate evidence that a Violence Prevention Program was effective in decreasing risks of violence. Major risk factors for violence are long waiting times, discrepancy between patients' expectations and services offered, substance abuse by the patient and a psychiatric condition. Appropriate workplace design and work policies aim to reduce risk factors but there is no hard evidence on the effectiveness of these interventions. One RCT provided evidence that a patient risk assessment combined with tailored actions decreased severe aggression events in psychiatric wards. Applying de-escalation techniques during an event of aggression is highly recommended. Post-incident reporting followed by root cause analysis of the incident provides the basic input for review and optimisation of the Violence Prevention Program.

Discussion: This review documented interventions to prevent and de-escalate aggression against doctors. The review failed to gather sufficient numeric data to perform a meta-analysis due to heterogeneity in population, intervention and study design.

Interpretation. Aggression against physicians is a serious occupational hazard. There is moderate evidence that an integrated Violence Prevention Program can decrease the risks of patient-to-worker violence.

Strengths and limitations of this study

- This review documented interventions to prevent and de-escalate aggression against doctors
- All available medical databases were explored in answer to the research questions
- All types of research and publications were included
- The review failed to gather sufficient numeric data to perform a meta-analysis

Keywords: aggression, workplace violence, interventions, doctors, general practitioner

Word count 3813

Introduction

Aggression against physicians including verbal, physical and psychological aggression is a well-known and serious occupational hazard. The prevalence of violence in health care is extensively documented through large studies in various settings and populations. Subjective interpretation of violent behaviour and underreporting of workplace violence is consistently cited in literature and leads to heterogeneity in results and conclusions.

A large, nationwide Australian study (MABEL) reported on the 12-month prevalence of verbal or written and physical aggression in Australian clinical medical practice: 70.6% of 9951 Australian doctors experienced verbal or written aggression and 32.3% experienced physical aggression in the previous 12 months. More specifically the 12 month prevalence of verbal aggression towards general practitioners was 54.9%, the physical aggression was 23.4%.⁽¹⁾ In a survey in the UK 78% of all GPs experienced at least one verbal incident in the previous 2 years.⁽²⁾ A recent cross-sectional study among Flemish General Practitioners (GPs) showed that only about 5% of GPs never encountered aggression. Most frequently the aggression was verbally however, about 20% reported physical aggression and almost 8% report sexual aggression.⁽³⁾

A recent nationwide German Survey reported that 91% of GPs had been object of aggression in their career and 73% in the previous 12 months.⁽⁴⁾ Typically, the highest rates of physical aggression were found in emergency departments and in psychiatric units. A recent Systematic Review and meta-analysis showed a pooled incidence of 36 of every 10 000 presentations to the emergency department of which 44% were associated with drug and alcohol exposure.⁽⁵⁾ More than one quarter of emergency physicians reported that they were victims of physical assault in the past year.⁽⁶⁾ A large RCT in hospital setting identified between 8 and 15 reported violence events per 100 full time equivalents per year in the hospital.⁽⁷⁾

In the health care setting, the most common type of workplace violence is where the perpetrator is the patient or a relative of the patient. These events are categorized in literature as "type II workplace violence". Exposure to work place violence can lead to physical and psychological injury, reduced job satisfaction and detachment and affects the quality of care.

Although the impact of work place related aggression is considerable and well documented, there is no systematic evidence on how to prevent, intervene and approach hazardous situations. Despite the heterogeneity in scientific and event reports about workplace, related violence there is consensus that safety action plans should be established and implemented. Therefore, the primary research question in this study is: "What are interventions to prevent aggression against doctors in general and against the general practitioner in particular?"

Methods

This systematic review is performed according to PRISMA guidelines. ⁽⁸⁾ For the randomized controlled studies the risk of bias was assessed and reported using the Cochrane classification scheme for bias.⁽⁹⁾

Eligibility and inclusion Criteria

Abstracts published in English between January 2000 and April 2019 were screened for inclusion. Eligible studies focussed on prevention of type II Workplace Violence: verbal, physical and psychological aggression from a patient or a patient's relative to a health care worker. Studies focussing on 'aggression' by co-workers were excluded.

Qualitative and quantitative intervention studies were included. Systematic reviews and Reviews on prevention strategies were included. Single case reports or opinion articles were excluded.

1
2
3 The target population was defined as a health care worker in General Healthcare, Psychiatric
4 departments, Emergency Departments, Emergency Primary Care, General Practice. Eligible
5 interventions were focussing on risk factors, workplace violence prevention or strategies to reduce
6 workplace violence. Comparison was, as far as present, defined as usual care and strategy in case of
7 the reporting of a hazardous situation.

8 For evaluation of effectiveness of the intervention, the primary outcome of interest was patient
9 aggression towards healthcare workers. Secondary outcomes were risk factors, staff knowledge, staff
10 skills, and early detection of aggressive behaviour. Per type of intervention, the major findings were
11 extracted and discussed.
12
13

14 *Search strategy*

15 Databases utilized were Pubmed, Embase, TRIP, Cochrane and Psycharticle with different search
16 strategies (see appendix). The following search terms/Mesh terms were used: aggression, violence,
17 physician, doctor, workplace, prevent*, strateg*, intervent*, general practitioner, health care. The
18 reference list of articles was scanned additionally. A separate search was performed on Google
19 Scholar and www.guideline.gov using the same search terms.
20
21

22 *Data collection and analysis*

23 The selected intervention studies were grouped in two groups: quantitative and qualitative studies.
24 The Systematic Reviews were reported separately. For each selected study, the design, type of
25 intervention and key findings were analysed. A level of evidence was attributed to each quantitative
26 study based on the Oxford 2011 Levels of Evidence (10). The quantitative studies were rated
27 according to the GRADE (11)(12). For the qualitative studies the GRADE-CERQUAL approach was used
28 to assess quality (13).
29
30

31 *Competing interests and funding*

32 There were no competing interests or external or internal funding involved in this research.
33
34

35 *Patient and Public Involvement*

36 Patients were not actively involved in this literature research. In a prior master thesis research, a
37 need assessment among general practitioners was conducted.
38
39

40 *Data availability*

41 Data on the search strategy and the harvest of retrieved articles are available on request.
42
43

44 **Results**

45 The total harvest of articles is presented in appendix 1. In total 105 full text articles were read and
46 assessed for eligibility. 44 studies of which 15 quantitative, 15 qualitative studies, 7 systematic
47 reviews and 7 reviews were included in this review (figure 1).
48
49

50 *Summary of results*

51 The results of the quantitative studies are presented in table 1, those of the qualitative studies in
52 table 2. Table 3 summarizes the Systematic Reviews and other Reviews. Table 4 gives an overview of
53 frequently cited guidelines. Table 5 summarizes the factors that may increase the risk of Workplace
54 Violence.
55
56

57 *Studies reporting on Interventions*

58 The interventions most frequently discussed and evaluated through are grouped. The first group of
59 interventions was labelled as pre-event preventive measures: components of an integrated violence
60

1
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3 prevention program. The second group was labelled as interventions taking place during a violent
4 event: applying de-escalation techniques and activating specific violence emergency procedures. The
5 third group was labelled as post-incident interventions: incident reporting followed by root cause
6 analysis of the incident and review of violence prevention policy.
7

8 9 *Pre-event preventive measures*

10 Under this label two types of interventions were identified: violence prevention programs and
11 risk assessment and risk control measures.
12
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14 *Violence Prevention Programs*

15 A variety of violence prevention programs has been developed in order to prevent work place
16 violence and to manage and mitigate the impact of violence at work. They all propose an integrated
17 approach incorporating basic elements such as, a worksite risk analysis, hazard prevention and
18 control measures, safety training and education, violent event reporting and evaluation. Some
19 programs explicitly apply the Plan-Do-Check-Act model of continuous quality improvement.
20 *Arnetz et al.* investigated in a large RCT the effect of the Plan-Do-Check-Act model, through a data
21 driven worksite based intervention in 41 units across seven hospitals in US over a period of 5 years.
22 (14) The study provided moderate evidence of this approach in decreasing risks of patient-to-worker
23 violence and related injury at six months post intervention: the incident rate ratio (IRR) of violent
24 events was significantly lower on intervention units compared to control: IRR 0.48, CI (0.29-0.80).
25 However, this effect was not confirmed over time during the 24-month follow up period. At that
26 time, only the violence related injury was lower on intervention units compared to control (IRR 0.37,
27 CI (0, 17-0.83)). *Lipscomb et al.* evaluated in a 4-year study the impact of the implementation of the
28 OSHA guidelines and compared three intervention groups with 3 comparison groups in mental health
29 facilities. (15) Both the intervention and the comparison group implemented safety preventions but
30 the comparison group did not benefit from the support of the additional project team on violence
31 prevention. The staff in both intervention and comparison group reported significant improvements
32 in the OSHA elements: management commitment, employee involvement, and hazard assessment
33 and hazard control activities. Intervention facilities reported also significant improvement in the
34 training element. There was no significant reduction in physical assaults in the intervention group nor
35 in the comparison group. There was a significant increase in threats in the intervention group (+98%,
36 $p < 0.001$). The authors suggested a greater tendency to report less severe events in the intervention
37 group as a possible interpretation for this unexpected finding.
38

39 *Mohr et al.* investigated in a longitudinal study the impact of the implementation of a Workplace
40 Violence Prevention Program (WVPP) and its different dimensions in 138 Veteran Health Care
41 Facilities.(16) Overall, there was no significant change in assault rates over time. The training
42 dimension showed a significant but moderate 5% reduction in standardised incidence rate. The
43 authors argue that the large variation across the facilities and the underreporting prior to WVP
44 program might provide an explanation for the results. *Magnavita et al.* studied the effect of an
45 aggression minimization program in a small-scale psychiatric unit in Italy. The interventions included
46 changes in architecture and work organization and training of employees. A stable and significant
47 reduction in assault rate per employee from 0.24 to 0.04 per year was reported.(17)
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54 *Risk assessment and risk control measures* (Table 5)

55 Violence risk assessment and violence management are intrinsically connected. The risk factors can
56 be categorized based upon their source of origin: workplace design, work organization, patient
57 factors, physician factors and social context. Numerous studies confirmed the following items as
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3 main risk factors for aggression: long waiting times, discrepancy between patients' expectations and
4 the services offered, alcohol or drug abuse by the patient and a psychiatric condition.

5 Subsequent to the specific violence risk assessment, taking appropriate risk control measures is the
6 next step. Changes to the physical environment and work policies are based on situational crime
7 prevention and aim to increase the effort of criminal activity, increase the risk of getting caught,
8 reduce the rewards of criminal activity, reduce provocations and remove excuses for disruptive and
9 violent behaviour.(18)

10 The proposed changes to the physical environment vary across the different health care settings and
11 may include effective indoor and outdoor lighting, sufficient exit routes, and physical barriers for
12 receptionists, automatic door locks, video cameras, panic buttons, portable alarms, comfortable
13 waiting areas to reduce stress. No concrete evidence exists on the effectiveness of these
14 interventions.(19) (6)(20)(21)(22) In some emergency departments in the US, metal detectors have
15 been installed, although they may theoretically mitigate violence, there is no concrete evidence to
16 support this expectation.(6)

17 Adequate work policies include "zero tolerance" policies, incident reporting, training of staff,
18 adequate staffing, policies on drug prescription and storage, a roadmap to follow when faced with
19 aggressive behaviour and additional measures for out-of-hours services. Drugs, cash and
20 prescriptions should be stored in locked places and limited amounts. Long waiting times should be
21 managed by improving staffing levels during busy periods and by setting up courtesy message
22 systems to alert patients about delays.(21)(23) Some guidelines and studies propose a "zero
23 tolerance policy" with explicit statement and warning signs stating that violence will not be
24 tolerated. It is important to recognize verbal assault as a form of workplace violence since it is a risk
25 factor for physical violence. (21) Some authors advise to restrict or withdraw access to general
26 practice or emergency department services for patients with a history of violence.(18) However, this
27 also might compromise the equality of access to care principle and there is no evidence on the
28 impact on violence reduction. General practitioners should take additional measures for out-of hours
29 house call services such as using a central dispatch centre or a shared visit schedule and tracking
30 system. Additional support might be provided in certain circumstances or upon request of the GP.
31 *Ifediora et al* investigated the implementation of safety measures by GPs on after-hours call services
32 in Australia: overall 43% of doctors adopted protection measures while on after-hour house calls, for
33 example, 34% used additional chaperones or security personnel. The study did not investigate the
34 impact of these measures on violence incidents.(24) *Morken et al.* investigated in a cross sectional
35 study the implementation of 22 safety recommendations in 210 Emergency Primary Care Centres in
36 Norway. The study provides an indication on the perceived usefulness and feasibility of the
37 recommendations.(25)

38 Training of staff in communication skills, violence and de-escalation techniques should be included in
39 a comprehensive violence prevention program. Effective training on de-escalation should focus on
40 cognitive, affective and skills based improvements. Self-awareness and the ability to connect
41 interpersonally are crucial. *Price et al* investigated in a systematic review, the cognitive and affective
42 outcome and the effectiveness of training on violence. There is currently limited evidence that this
43 training has an effect on de-escalation of aggressive behaviour.(26) As discussed hereafter, de-
44 escalation is a highly skilled intervention and this may explain the limited effectiveness of time-
45 constraint training programs.(27)

46 With respect to patient risk factors, the risk of violence is dynamic and contextual.(28) Violence in
47 medical health care is mostly impulsive and accompanied by the fight flight response although also
48 premeditated aggression occurs. Patient aggression risk assessment tools have shown to be effective
49 as a predictor for short-term violence. *Abderhalden et al.* investigated in a RCT the use of short-term
50 risk assessment in 14 acute psychiatric wards in Switzerland. The intervention consisted of a
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3 structured risk assessment twice daily combined with a communication of risk scores and a
4 recommendation for actions tailored to the risk level. The study showed a significant reduction in
5 severe events of patient aggression, a significant reduction in attacks and a significant reduced need
6 for coercive measures.(29) Flagging patients with a history of violent events resulted in a 90%
7 reduction in assault by high risk patients in Veteran Health Care hospitals in US.(30)
8
9

10 *Interventions during event*

11 During the event of violence the following recommendations are described in guidelines: stay calm
12 and apply de-escalation techniques, if de-escalation fails, take care of your own safety, go away or
13 use self-defence techniques and activate the emergency procedure (references in table 4).

14 The use of restrictive interventions should only be applied in accordance with pre-established
15 protocols and in a manner that complies with the Human Rights.

16 De-escalation is not only in the medical care sector but also in other settings a highly recommended
17 component of violence prevention. Garriga et al. (table 3) carried out a systematic review on
18 assessment and management of agitation in psychiatry. (31) After identification of possible medical
19 causes for agitation, verbal de-escalation and environmental modification are the first choice of
20 intervention.
21

22 As established by *Richmond et al.*, de-escalation can be successful in less than 5 minutes. Non-
23 coercive de-escalation is practiced in a 3- step approach: firstly the patient is verbally engaged,
24 secondly a collaborative relationship is established and thirdly the patient is verbally de-escalated
25 out of the agitated state table 2.(32) De-escalation frequently takes the form of a verbal loop in
26 which the clinician listens to the patient, finds a way to respond that agrees with or validates the
27 patient's position and then states what he wants the patient to do. The clinician may have to repeat
28 the loop a dozen or more times and inexperienced clinicians tend to give up.(27)

29 Similar principles of de-escalation have also been described by *Kohlrieser*, a psychologist and hostage
30 negotiator.(33)
31
32

33 *Post-incident measures*

34 As studied by *Geoffrion et al.* individual and organizational factors can lead to trivialization of
35 workplace violence, a culture of silence and underreporting of workplace violence. Two aspects play
36 a role in trivialization of workplace violence: normalization of violence as being "part of the job" and
37 taboo: avoiding an open discussion out of fear of being stigmatized as incompetent and thus
38 refraining from complaining about it. Colleague and employer support, training on violence, zero
39 tolerance policy all contribute to normalization of violence but decrease the likelihood of taboo.
40 Organizations should be aware of this paradox and may be implicitly sending the message that
41 violence is to be expected.(34)

42 Reflecting on incidents or performing a root cause analysis in team specific workshops can identify
43 systematic weaknesses and potential solutions, action plans and revision of the WPV policy.(35)

44 Victims should be provided with assistance and support while addressing short and long-term
45 consequences. *Schat et al.* investigated the effect of organizational support in reducing the negative
46 consequences of workplace violence and found a small positive effect on emotional wellbeing,
47 somatic health and job related affect but there was no effect on fear of future violence and job
48 neglect.(36)
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Discussion

Summary of main results

This review demonstrated that few studies have been successful in providing evidence on efficacy of interventions to prevent aggression against doctors and more specifically against the general practitioner. Only one RCT provided moderate evidence that a Violence Prevention Program was effective in decreasing risks of patient-to-worker violence and related injury.(14) By contrast, longitudinal studies showed conflicting results in assault rates after implementation of a Workplace Violence Prevention Program.(16)(37)(30) Appropriate workplace design and work policies aim to reduce risk factors for violence such as long waiting times and crowded waiting areas but there is lack of hard evidence on the proposed interventions.(6)(20)(21)(22) During the event of violence or agitation, applying de-escalation techniques is a highly recommended component of violence prevention and physical restraint should be considered as a last resort strategy.(31) Post-incident interventions such as incident reporting followed by root cause analysis of the incident provides the basic input for review and optimisation of the Violence Prevention Program.

This review included quantitative and qualitative studies, focussing not only on violence incidence rates but also on why and how an intervention works. Although there is lack of hard evidence on the effectiveness of Occupational Health and Safety Management Systems, there is wide consensus that the implementation of a comprehensive health and safety prevention plan is the key to understanding, preventing and dealing with Workplace Violence.(38) As stated by *James* in his book *Violence assessment and intervention*: 'Preparation is critical as long as you accept that whatever you plan for and however you plan for it to occur, will never happen. Preparation is the "primer" to get you propelled toward resolve and is important in addressing a crisis.'(39)

A work site-specific violence risk assessment provides the basic input for interventions. The focus of prevention and intervention goes to both the clinician and logistics or infrastructure. Major risk factors for violence are long waiting times, discrepancy between patients' expectations and the services offered, alcohol or drug abuse by the patient or a psychiatric condition. Specific risk control measures on the level of work policies to ensure adequate staffing and reduce waiting times and training personnel in de-escalation seem rational interventions even without hard evidence. The dynamic nature of risk feeds the issue of unintended consequences or the "intervention dilemma". This dilemma states that any intervention has the capacity to reduce risk does not affect risk or even intensifies risk.(28) On the level of workplace design and work policies, a 100% security will never be obtained. A balance has to be made between safety and quality of life and quality of care.(39) Some interventions proposed to increase safety may be in conflict with the goals of health care. For example, a zero tolerance policy or flagging patients with violent history can lead to stigmatization of the patient and can be in conflict with patient confidentiality and the right to medical care. Implementation of overt measures such as security guards or barricades between staff and patients might impair the doctor-patient relationship, which can lead to a spiral of fearfulness and suspicion and ultimately a greater risk of violence. Evidence suggests that individuals with an increased risk for violent acts are not violent at all times nor in all situations.(20)

De-escalation, if undertaken with genuine commitment and with the collaborative goal of "helping the patient calm himself" has successful outcome in far more cases than previously thought possible and it can be successful in less than 5 minutes. (31)(32). De-escalation is a highly skilled intervention and this may explain the limited effectiveness of time-constraint training programs.(27)

Underreporting is a well-known issue in Workplace Violence Management. It is partly due to normalization of violence as being part of the job and perceived taboo associated with complaining about violence. Underreporting is influenced by interventions itself and complicates research and interpretation of results.

Victims of type II Workplace Violence should be provided with assistance and support while addressing short and long term consequences.(36) A decline in frequency of assaults occurs after

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3 implementation of a peer help program for assaulted staff and unavailability of debriefing is
4 associated with increased reports of post-traumatic stress.(40)
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6 *Limitations*

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8 The first limitation lies in the risk of bias across studies since mainly English and some French,
9 German and Dutch publications were screened. Second, research on Work Place Violence is also
10 published outside the traditional international medical scientific literature databases.

11 The second limitation lies in the risk of bias within studies. Only three randomized controlled trials
12 are included in this review.(14) (29) (41) Performance bias, detection bias and reporting bias are
13 present in all studies. Due to the nature of the problem and the interventions, allocation
14 concealment, blinding of participants and blinding of outcome assessment is not possible. Also as
15 discussed in this review, underreporting and selective reporting is a well-known issue in Workplace
16 Violence, is variably present in all studies and is influenced by the intervention itself.(14) Recall bias
17 is also present due to data collection in the form of questionnaires inquiring about violent events
18 over the past 12 months.(41) Finally, performance bias is present in all studies through various
19 mechanisms: a medical care setting is a complex structure and organisational changes might have an
20 impact on care quality and on safety performance and might interfere as a co-intervention.
21 Moreover, in all randomized controlled trials, the control group will always have its own safety
22 prevention policy.
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26 *Suggestions for further research*

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28 We believe that a large and long-term cohort study could provide more insight and evidence on
29 effective interventions to prevent aggression against the general practitioner. Risk factors for type II
30 workplace violence are well-known, however there are insufficient data on protective factors for
31 aggression against doctors. Analysis of large amounts of data on the cohort should have enough
32 statistical power to provide insight in the protective factors and effectiveness of interventions
33 against type II workplace violence.
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35 With respect to preventive measures, a yearly update on the applied safety measures and other
36 characteristics per general practice is to be determined. Basic information on recommended safety
37 prevention measures and training on de-escalation techniques should be available to the cohort.
38 With respect to post-event interventions, the general practitioners in the study cohort could
39 implement a shared violence incident-reporting tool.
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43 **Conclusion**

44 Aggression against physicians is a well-known and serious occupational hazard. There is moderate
45 evidence that an integrated Violence Prevention Program can decrease the risks of patient-to-worker
46 violence. Appropriate workplace design and work policies aiming to reduce risk factors and applying
47 de-escalation techniques during an event of aggression are highly recommended. Taking into
48 account that detection, reporting and performance bias will inherently be present in any RCT on
49 interventions against Type II workplace violence, we believe that a large cohort study could provide
50 more evidence on effective interventions to prevent aggression against the general practitioner.
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Tables

GP: General Practice, ED: Emergency Department, WPV: Workplace Violence, Psy: Psychiatric setting, Gen: General Health Care, EPC: Emergency Primary Care; ICU: Intensive Care Unit, GER: Geriatrics

Level according to Oxford 2011 levels of evidence.

Outcome quality rating in accordance with GRADE methodology.

Table 1 Summary of selected quantitative studies

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Arnetz et al., 2017 (14)	US, 7 hospitals, 41 units, 2800 employees,	Level 2 Moderate	RCT intervention 5 years, 4 phases Data driven, worksite based intervention plan-do-check-act Hazard Risk Matrix to identify high risk units in intervention and control groups	<ul style="list-style-type: none"> Plan-Do-Check-Act model data driven and worksite based intervention stakeholder involvement 	<ul style="list-style-type: none"> rates of violent events rates of violent related injuries intervention compared to control group evolution over time compared to baseline 	<p>Rates of violent events:</p> <ul style="list-style-type: none"> Six months post intervention, incident rate ratio of violent events (IRR) was significantly lower on intervention units compared to control IRR 0.48 CI (0.29-0.80) Rates of violence decreased slightly but not significantly in the intervention group compared to baseline and increased significantly in the control group compared to baseline. Significantly increased violent event rates at 24 months compared to baseline in both groups: Intervention group from 8 to 13.8 per 100FTE and control group from 8 to 15.4 per 100 FTE. <p>Violence related injuries:</p> <ul style="list-style-type: none"> 24 months post intervention, the violence related injury was lower on intervention units compared to control IRR 0.37 CI (0,17-0.83)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						Remark: results were not consistent over time during 24 month follow up period.
Abderhalden, 2008 (29)	14 Acute psychiatric wards, 2364 patients Switzerland PSY	Level 2 Moderate	RCT: 14 acute psychiatric wards, 2364 patients phase 1: 3 months baseline data phase 2: 3 months intervention period	<ul style="list-style-type: none"> structured short term risk assessment : Swiss version of Brøset Violence Checklist, 2 times per day during first 3 days in case of high risk (1 in 10 patients will physically attack during next shift): discuss possible prevention measures from list in case of very high risk (1 in 4 patients): multidisciplinary team discussion on preventive measures and plan and implement preventive measures. 	<ul style="list-style-type: none"> risk assessment incident rates staff observation aggression scale attacks coercive measures 	<ul style="list-style-type: none"> Significant reduction in severe events of patient aggression: adjusted risk reduction 41% intervention versus control 15%, p < 0.001 Significant reduction in attacks: 41% versus 7%, p < 0.001 Significant reduced need for coercive measures : 27% reduction in intervention group versus 10% increase in control, p < 0.001 Structured risk assessment twice daily in acutely admitted psychiatric patients combined with a communication of risk scores and a recommendation for action tailored to risk level reduced the incidence rate of coercive measures and severe aggressive incidents.
Arnetz, 2000 (42)	47 health care work places 1500 nurses in Emergency departments, geriatric, psychiatric, home healthcare	Level 3 Low	RCT Implementation and evaluation of a practical intervention program for dealing with violence towards health care workers.	<ul style="list-style-type: none"> violence incidence form in intervention and control group structured feedback program in intervention group 	<ul style="list-style-type: none"> awareness of risks of violence ability to deal with aggressive situations exposure to violent incidents 	<ul style="list-style-type: none"> better awareness of risk situations and of how to deal with aggressive patients (Low) 50% increase in incident reporting in intervention group compared to control group (Low)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2006 (15)	Sweden ED, Psy, GER New York State 26 units: 6 units selected Psy	Level 3 Low	<ul style="list-style-type: none"> evaluation of the impact of OSHA guidelines on workers health and safety 3 intervention groups, 3 comparison groups base line and post intervention survey 4 years study 	<ul style="list-style-type: none"> OSHA guidelines serves as framework 1. Management commitment to Violence Prevention Program 2. Employee involvement in VPP 3. Hazard assessment activities 4. Hazard control activities: infrastructural, organizational, environmental, administrative, behavioural 5. Training 	<ul style="list-style-type: none"> staff perception of quality of program elements frequency of reported threat and physical assaults in intervention and comparison facility pre- and post-intervention 	<ul style="list-style-type: none"> Staff in both intervention and comparison group reported significant improvements in first 4 elements of the OSHA elements (Low). Intervention facilities reported significant improvement in the training element. (Low) No significant reduction in the change in physical assaults in intervention group nor in comparison group Significant increase in threats of assault in intervention group (+98%, p <0.001), a non significant increase in comparison group (+47%, p= 0.08) remark: Both the intervention and the comparison group did implement safety preventions but the comparison groups did not benefit from the support of the team resources of the worksite violence study.
Magnavita, 2011	small scale psychiatric unit Italy about 85 workers	Level 3 Low	<ul style="list-style-type: none"> pre- and post intervention comparison test 	aggression minimization program as part of total quality management 1) architecture and work organization: <ul style="list-style-type: none"> rearrangement of building, 3 assistance 	<ul style="list-style-type: none"> Violence Incident Form assault rate: pre and post-intervention 	<ul style="list-style-type: none"> Mean assault rate per employee was significantly reduced from 0.24 per year to 0.04 per year after the intervention Stable decline over time in assaults after the intervention

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
				areas depending upon severity of mental illness • increased nurse-to-patient ratios, staff coverage • remove patients from monitoring tasks • improved lighting • safety alarms 2) Education	• assault rate for aggression using physical force • verbal abuse etc, not addressed	
Kling, 2011(43)	acute care hospital Canada 109 cases	Level 3, Low	pre- and post – intervention study evaluation of violent risk assessment system and retrospective case control	Violence risk assessment flagging in patient file and on wrist band and violence prevention training taking precautions such as : wearing personal alarm, security team nearby, not entering patient room alone, not having sharp objects	• violent incident risk • adjusted OR for violence in flagged patients	During intervention compared to pré-intervention • RR hospital: 0.57 (0.33-1.83) (not significant) • RR direct patient care workers: 0.52 during intervention (0.33-0.81) • RR high risk department: 0.39 (0.24-0.61) Post intervention compared to pre-intervention • RR hospital 1.01 (0.989-1.04) • RR direct patient care workers 1.03 (1.00-1.06) • RR high risk department: 1.04 (1.01-1.07) In contrast to hypothesis: • adjusted OR for violent incident 6.28 for patients flagged by the Alert System

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Mohr, 2011(16)	138 Veterans Health Care Facilities	Level 3 Low	<ul style="list-style-type: none"> • Longitudinal study • Impact of implementation of a workplace prevention program on rates of workplace violence over a period of 6 years: 2004-2009 • Relationship of assault rates with WPV dimension score • percentage change in assault rates in 2009 compared to 2004 	<ul style="list-style-type: none"> • Implementation of a Workplace Violence Prevention Program • WVP dimension score 	<ul style="list-style-type: none"> • 43 WVP items, grouped in 3 dimensions : training, workplace practices, environmental control and security • standardized assault rate 	<ul style="list-style-type: none"> • Overall there was an increase in assault rates over time: from 59 to 71 per 10.000 FTE • 34% of facilities had reduced assault rates, average improvement 42% • Facilities with no reduction had an average increase of 125% in assault rate • Training dimension: significant but moderate 5% reduction on standardised incidence rate (Low) • No significant change in assault rates over time possible explanation: <ul style="list-style-type: none"> • Large differences in facilities in assault rate reduction or increase • Underreporting prior to WVP program • Reduction in severity of assaults (workers compensation claims declined 40% between 2001 and 2008)
Hvidhjelm, 2014 (44)	forensic psychiatry, 156 patients Denmark Psy	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • sensitivity and specificity of the Brøset Violence Checklist • 156 patients, checked 3 times per 	<ul style="list-style-type: none"> • BVC 6 items checklist as predictor of short-term (<24u) risk of violence • score 6 items: presence or absence of: confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> • risk of violence within 24 hours 	<p>BVC showed overall satisfactory specificity and sensitivity as a predictor of short term risk of violence, (Low) score ≥ 3:</p> <ul style="list-style-type: none"> • sensitivity : 65.6%, • specificity 99.7% with overall risk 0.3%: • PPV score ≥ 1: 17.5%

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			day during 24 months			<ul style="list-style-type: none"> • PPV score ≥ 3: 37% • NPV score < 3: 99.9%
Partridge, 2017 (45)	Emergency Department, 2046 patients Australia ED	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • statistical utility of the Brøset Violence Checklist by a security officer in emergency department 	<ul style="list-style-type: none"> • predicting aggressive patient behaviour using the Brøset Violence Checklist by security officers in ED 	<ul style="list-style-type: none"> • short term risk of violence 	<p>BVC showed a good sensitivity, specificity and predictive value of short term risk of violence, (Low): overall risk 1.7%</p> <ul style="list-style-type: none"> • score ≥ 1: PPV 16.7% , LR+ 11.6 sensitivity 88.6%, specificity 92.4% • score ≥ 2 : PPV 34.2%, LR+ 30.3 sens. 65.7%, spec. 97.8% • score ≥ 3: PPV 55.2 % ,LR+ 71.4 sens. 45.7%, spec. 99.4%
Morken, 2013 (46)	210 Emergency Primary Care Centres Norway GP	Level 5 Very Low	Cross sectional study, survey on application of 22 safety measures items in 210 Emergency Primary Care Centres	<ul style="list-style-type: none"> • Available staff: extra person during home visit when needed (44%), more than one person on duty (30%) • Reception design with glass barrier (86%), view to entrance (62%) and waiting rooms (72%) • Consulting room setup: alternative exit (59%), quick entrance/exit for staff (46%), patient not sitting between clinician and door (29%) • Electronic Safety systems: alarm on medical radio network (74%), automatic door lock (54%), portable alarm (28%), CCTV camera (28%), ... • Training (40%) • Reporting: Monitor and follow up of Violence episodes (75%) • No reporting of number of violent incidents • 98% response rate • No results on effectivity • Application of measures give indication on perceived usefulness of recommendations and feasibility of recommendations 		
Nau, 2009 (47)	63 nursing students attending	Level 5 Very Low	Longitudinal pre- and post test study	<ul style="list-style-type: none"> • 3 days training course 	<ul style="list-style-type: none"> • Confidence in coping with 	<ul style="list-style-type: none"> • Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (Very Low)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	training course, Germany		The development and testing of a training course in aggression for nursing students		<ul style="list-style-type: none"> patient aggression 10 item scale no results on actual performance in health care settings 	<ul style="list-style-type: none"> Training should be seen as a valuable initial step in developing aggression related requirements
Schat, 2003 (36)	Health care setting 225 employees in health care	Level 5 Very Low	organizational support: reducing adverse consequences of workplace aggression Survey, moderated multiple regression	secondary prevention: moderating effect of organizational support: instrumental support (e.g. support from co-workers) and informational support (e.g. training) on negative consequences of workplace aggression and violence	<ul style="list-style-type: none"> fear of future violence emotional well-being somatic health scale job related affect job neglect 	<ul style="list-style-type: none"> instrumental support: positive effect on variance of (3%-6%) : emotional well-being, somatic health, job related affect. No effect on fear of future violence and job neglect. (Very Low) information support: positive effect on variance of (3%-6%) emotional well-being, no effect on other outcomes. (Very Low) no effect on: fear of future violence and job neglect
Chris Ifediora, 2015 (24)	General Practice Australia 300 doctors of National Home Doctors Service after hours house call services GP	not applicable	Survey: exploring the safety measures by doctors on after-hours house call services	<ul style="list-style-type: none"> No study of impact on violence incidents 57% response rate Safety measures by doctors on after-hours call services: <ul style="list-style-type: none"> overall 43% of doctors adopted protection measures while on after-hour house calls use of chaperones/security personnel: 34% dependence on surgery policies such as vetting and blacklisting risky patients, documenting doctor's destinations: 31% de-escalation or self-defence techniques: 19% panic buttons:7% personal alarms:6% 		
Hills, 2013 (48)	Australia, clinical medical practice,	not applicable	Cross-sectional study, self report survey of	No report on effectivity of measure Implementation of recommendations: 1. policies, protocols for aggression prevention and management: 66%		

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	9449 doctors of which 3515 GPs		implementation of 12 prevention and minimisation actions MABEL survey	2. warning signs in reception: 3. alerts to high risks of aggression: 4. restricting or withdrawing access to services for 5. incident reporting and follow up: 6. Education & training: 7. Alarms : 8. Clinician escape: 9. optimized lighting, noise level, comfort and waiting time in waiting area: 10. patient access restriction: 11. Building security system: alarm, camera, ...: 12. safety measures for after-hours on-call work or home visits:	49% 52% 68% 53% 47% 23% 52% 62% 70% 34%	aggressive persons: 45%
Geoffrion, 2015 (34)	1141 healthcare workers and law enforcers, Canada GEN	not applicable	Survey : Individual and organizational predictors of trivialization of workplace violence among healthcare workers and law enforcers.		<ul style="list-style-type: none"> normalization of violence as being “part of the job” taboo: avoiding open discussion, fear of being stigmatized as incompetent 	<ul style="list-style-type: none"> discussion on underreporting Individual factors in healthcare: <ul style="list-style-type: none"> men are more likely than women to consider WPV as part of the job (34% versus 23%) and perceived a taboo (54% vs 42%) Staff with more than 15 years of work experience are more likely to tolerate WPV as part of the job Organizational factors: <ul style="list-style-type: none"> colleague and employer support, training, zero tolerance policy contribute to normalization of violence but decrease the likelihood of taboo

Table 2: Summary of selected qualitative studies
GRADE-CERQual assessment

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie, 2013 (49)	3 Emergency Departments US 80 employees ED	Medium	Implementation and Evaluation of a sustainable comprehensive department-based ED violence prevention program. Action research principle: academic researchers partner with clinicians and collaboration with stakeholders	<ul style="list-style-type: none"> WPV policies and procedures: e.g. risk assessment, recordkeeping, response to violent events. WPV education Environmental changes: e.g. panic buttons, lock doors, cameras 	<ul style="list-style-type: none"> Impact on violence rates was not reported Program fidelity: Variable success in institutionalizing and sustaining intervention subcomponents. Mixed overall evaluation of program by employees: <ul style="list-style-type: none"> Employees rated the program as moderately beneficial. Surveillance and monitoring environmental changes, education and post incident care were rated as very important Policies and procedures were rated as important Managers and educators program evaluation: <ul style="list-style-type: none"> Most important components were : surveillance, environmental changes, class room training and post incident-care. WPV assessment screening at triage for all patients was evaluated as least effective There was a low participation level of physicians. Underreporting of violent events
Henson, 2010 (18)	Emergency Departments Situational Crime Prevention in Emergency Departments ED	Medium	Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory	<ul style="list-style-type: none"> Increase the Effort of criminal activity: e.g. secure entrances/exits, metal detectors Increase the Risks of getting caught: e.g. install CCTV cameras Reduce the Rewards of criminal activity: e.g. reduce the amount of prescription drugs carried by staff 	<p>In many EDs these interventions are partially implemented based upon risk assessment and prevention rationale. A systematic test of the proposed prevention techniques is not performed.</p> <p>Remark:</p> <ol style="list-style-type: none"> Situational crime theory is based on rational choice however, violence in healthcare is mostly impulsive and unplanned. To deny access to ED if patient is drunk or intoxicated is in conflict with the patients

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				<ul style="list-style-type: none"> Reduce Provocations: e.g. appropriate waiting areas, secure and isolate volatile patients Remove excuses for disruptive and violent behaviour: e.g. clearly post rules of conduct and consequences for breaking them, streamline check –in process form, refuse admission to intoxicated visitors 	fundamental right to healthcare and the physicians duty of care.
Holloman, 2012 (50)	Emergency Psychiatry Psy	Medium	Overview of Project BETA: Best Practices in Evaluation and Treatment of Agitation: to develop guideline including all interventional aspects : triage, diagnosis, verbal de-escalation and medicine choices.	5 study workgroups <ol style="list-style-type: none"> 1. medical evaluation and triage of the agitated patient 2. psychiatric evaluation of the agitated patient 3. Verbal de-escalation of the agitated patient 4. Psychopharmacologic approaches to agitation 5. Use and avoidance of seclusion and restraint 	
Stowell, 2012(51)	Emergency Psychiatry	Medium	BETA project Psychiatric Evaluation of the Agitated Patient.	Prior to attempting de-escalation, a brief evaluation must be aimed at determining the most likely cause of agitation: <ol style="list-style-type: none"> 1. Has the patient an acute medical problem ? 2. Has the patient a delirium ? 3. Has the patient a chronic cognitive impairment that is contributing to the current state of agitation ? 4. Is the patient intoxicated or in withdrawal? 5. Is the patients agitation due to psychosis caused by a known psychiatric disorder? 6. Is the agitation due to nonpsychotic depression or anxiety disorder? 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7. Is the patient simply angry or out of control ? 8. Assess the risk of suicide and violence	
Richmond, 2012 (32)	Emergency Psychiatry	Medium	BETA project Verbal de-escalation of the agitated Patient .	The authors detail the proper foundations for appropriate training for de-escalation using the 10 domains of de-escalation:" 1. Respect the patient and your personal space: maintain at least 2 arm’s length of distance 2. Do not be provocative: avoid iatrogenic escalation. Body language and tone of voice should be congruent with what the clinician is saying. 3. Establish verbal contact: Only 1 person verbally interacts with the patient. Introduce yourself to the patient and provide orientation and reassurance, explain that you are there to keep him safe and make sure no harm comes to him or anyone else. 4. Be concise and keep it simple, use short sentences, give the patient time to process and respond. 5. Repetition is essential to successful de-escalation, repeat your message until it is heard, set limits and offer choices, listen actively to the patient and agree with his position whenever possible. 6. Identify wants and feelings: Use free information to identify wants and feelings. Listen closely to what the patient is saying use active listening and Miller’s law: you must assume that what the other person is saying is true and try to imagine what it could be true of, this makes you less judgmental and the patient will sense that you are interested in what he is saying and this will improve your relationship 7. Agree with the patient as much as possible or agree to disagree 8. Lay down the law and set clear limits: Establish basic working conditions: communicate these in a matter-of-fact way and not as a threat. This requires that both patient and clinician treat each other with respect. Limit setting must be reasonable and done in a respectful manner. Coach the patient in how to stay in control 9. Offer choices and optimism. Be assertive and propose alternatives to violence. Offer realistic things that will be perceived as acts of kindness such as blankets, drinks... Broach the subject of medication when needed and offer choices to the patient. The goal is not to sedate but to calm down. 10. Debrief the patient and staff”(32)	
Wilson, 2012 (52)	Emergency Psychiatry	Medium	Psychopharmacology of agitation	“	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			BETA project	<ol style="list-style-type: none"> 1. Pharmacologic treatment of agitation should be based on an assessment of the most likely cause for the agitation. If the agitation is from a medical condition or delirium, clinicians should first attempt to treat this underlying cause instead of simply medicating with antipsychotics or benzodiazepines. 2. Oral medications should be offered over intramuscular injections if the patient is cooperative and no medical contraindications to their use exist. 3. Antipsychotics are indicated as first-line management of acute agitation with psychosis of psychiatric origin. 4. When an antipsychotic is indicated for treatment of agitation, certain SGAs (such as olanzapine, risperidone, or ziprasidone), with good evidence to support their efficacy and lack of adverse events, are preferred over haloperidol or other FGAs. Agitation secondary to intoxication with a CNS depressant, such as alcohol, may be an exception in which haloperidol is preferred owing to few data on second-generation antipsychotics in this specific clinical scenario. 5. If haloperidol is used, clinicians should consider administering it with a benzodiazepine to reduce extrapyramidal side effects unless contraindications to use of this medication exist. “(52) 	
Price, 2012 (27)	Process of de-escalating violence and aggression excluding patients with dementia	High	Key components of de-escalation techniques Qualitative research Thematic synthesis	<p>“7 themes</p> <p>Staff skills:</p> <ol style="list-style-type: none"> 1. characteristics of effective de-escalators: open, honest, supportive, self-aware, coherent, non-judgmental and confident without being arrogant 2. maintaining personal control: calmness conveys that the member of the staff is in control of the situation whereas fear can increase anxiety, make the patient feel either unsafe either that they have gained the upper hand. 3. verbal and non verbal skills: calm, gentle, soft tone of voice <p>Process of intervening:</p> <ol style="list-style-type: none"> 4. engaging with the patient: establish a bond 5. when to intervene 6. ensuring safe conditions for de-escalations 7. Strategies for de-escalation <ul style="list-style-type: none"> ○ autonomy confirming interventions <ul style="list-style-type: none"> ○ shared problem solving ○ facilitating expression ○ offering alternatives to aggression 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
					limit setting and authoritative interventions: knowing when to exert control and implement" (27)
Morken, 2015 (53)	Emergency Primary Health Care, Norway 15 nurses and 22 physicians	Medium	Focus group study, qualitative design Dealing with workplace Violence in emergency primary care focusing on organizational factors.	organizational strategies for workplace violence prevention: 1. Minimizing the risk of working alone: a. Having an efficient alarm system with adequate response time to summon someone. b. Regular turning up of colleague. 2. Being prepared: obtain information prior to the consultation, take precautions when facing warning signs, alerting colleagues or police in advance. 3. Resolving mismatch between patient expectations and services offered: e.g. clear and consistent procedures on not handing out drugs to patient and communicate these to the public. 4. Supportive manager response in follow up of a violent episode.	
Moylan, 2017(54)	General practice, Australia	not applicable	Discussion on practical measures to manage the risk of occupational violence based on guidelines from RACGP and WorkSafe Victoria. (55), (56)	multilevel response: 1. workplace design 2. policies and work practices 3. training Before consultation: 4. Is there a quick exit route ? 5. Do you have an alarm mechanism or call for assistance ? 6. Are there patient flags for previous violence ? 7. Are there other client risk factors present ? 8. Is a chaperone required ? During consultation: 9. Are warning signs of violence present ? 10. De escalate versus end consultation ? After the consultation: 11. Has the patient left safely ? 12. Are others in practice safe? 13. Documentation of event ?	
Elston, 2016 (57)	General practice 1300 GPs 13 focus groups 19 in-depth interviews	Medium	Survey, in depth interviews, focus group discussions	<ul style="list-style-type: none"> No gender difference in overall risk of violence. Increased risk for physical assaults within younger, male GPs . Women were more likely to express concerns about violence . Women consistently adopted more preventive measures than men. Male and female GPs downplayed the impact of any violence. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
	English National Health Service UK		Gender differences in risk of violence and prevention measures.	<ul style="list-style-type: none"> Male and female GPs spoke of fear and being vulnerable. Fear and the impact of violence: differences in terms and tone between men and women GPs, higher emotional intensity in terms used by women GPs. Sexual assault and harassment: Male and female GPs are confronted with this. Women GPs explicitly suggested their professional standing protected them. Reducing risk and minimising harm: <ul style="list-style-type: none"> GPs strongly opposed to so-called "for dress medicine". GPs emphasising importance of professionalism and good communication skills to reduce risk and harm. Leaving visit schedule with someone. Check patient notes in advance. Policy adapted such that GPs use at their discretion the opportunity to be accompanied during home visits. 	
Sim, 2011 (23)	General practice, Australia	not applicable	Aggressive behaviour: Prevention and management in the general practice environment	<ul style="list-style-type: none"> Strategies to prevent aggression: <ul style="list-style-type: none"> Staff: friendly, patient focused approach, demonstrating willingness can reduce stimuli for aggressive behaviour System approach to reduce long waiting times: e.g. include emergency appointment slots, courtesy message systems to alert patients about delays, rescheduling late patients.... Management of aggression: <ul style="list-style-type: none"> Recognizing aggressive behaviour. De-escalating early aggression. Limit setting and follow up of incidents. Use of verbal or written behaviour contracts. System approach by applying the plan-do-check act approach. Establish a roadmap to follow when faced with aggressive behaviour. 	
Magin, 2010 (58)	General practice, Australia practice receptionists	medium	Semi-structured interviews Experiences and perceptions of GP receptionists with Perspex and lockdown system.	<ul style="list-style-type: none"> Perspex and lockdown system implemented or not implemented 	<p>Experiences and perceptions of GP receptionists:</p> <ul style="list-style-type: none"> positive perception about the safety measures for reducing risks concern to compromise the feeling of a practice being patient centred by alienating patients from staff and paradoxically increasing the levels of patient violence and staff fearfulness responders from low prevalence practices did not see the need for these measures

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Magin, 2008 (19)	General practice, Australia GP	Medium	Focus group discussions (18GPs) and questionnaire (154 GPs) Underlying and proximate causes of violence	<ul style="list-style-type: none"> risk factors: see discussion implementation of overt measures to deter violence such as security guards or barricades between staff and patients might impair doctor-patient trust and antagonize therapeutic relationships with mutual suspicion and misunderstanding spiralling into violence 	
Magin, 2007 (59)	General practice, Australia	not applicable	Occupational violence in general practice	<ul style="list-style-type: none"> risk factors: see discussion planning and training referral of patients to hospitals or other public facilities during out of hour service selective restriction of practice is perceived to compromise the equality of access to care principle and may lead to stigmatisation and discrimination RACGP recommendations summary of recommendation(55) RACGP recognises as well as GPs right to feel and be safe as the willingness of the GP to take care of people who may have a propensity for violence rather than the zero tolerance policy. 	
Naish, 2002 (35)	General Practice London	Medium	30 interviews and 5 focus groups (44 people)	<p>Strategies for incident management and team organization:</p> <ul style="list-style-type: none"> Immediate response: <ul style="list-style-type: none"> Containment and cooperation . Aimed at managing immediate incident, preventing escalation and preserving patient-staff relationship Medium term strategies: <ul style="list-style-type: none"> What lessons can a team learn from an aggressive incident? Adequate incident recording mechanism with agreed threshold for reporting and good support system with opportunities for individual and team debriefing. Long term strategies: <ul style="list-style-type: none"> Improved security for protection of staff , balanced with a welcoming environment for patients. Communication skills training and improved whole team communication Arrange primary care team specific workshops to review experiences , identify systematic weaknesses and formulate solutions on an inclusive multidisciplinary basis. Collective formulation of protocols for managing threatening encounters 	

Table 3: Summary of Reviews and Systematic Reviews

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Calow, 2016 (60)	Emergency Department nursing ED, Psy inpatient setting	Level 3 Low	Review: Evaluation of the use of risk assessment tools in the Emergency Department 13 articles included no studies with RCT design	<ul style="list-style-type: none"> • Use of risk assessment tools in Emergency Department • Does the use of an aggression risk assessment tool reduce the future risk of violence towards the health care worker ? • STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing • BVC: Brøset Violence Checklist inpatient setting, psychiatric units: 6-item tool confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> • prediction of short term violence • reduction of violence 	<ul style="list-style-type: none"> • Lack of high quality studies • Most prevalent risk assessment tools with good validity and sensitivity for early identification of aggressive behaviour: STAMP and BVC • STAMP violence assessment framework has been shown to be an effective tool in early identification of violent behaviour in ED setting (moderate) • BVC is the most prevalent tool in inpatient setting and shows best validity and reliability. (moderate) • there was no reporting on reduction of violence
Kynoch, 2011 (61)	Acute hospital setting nursing ICU ED	Level 3 Low	Systematic Review Interventions for preventing and managing aggressive patients in acute hospital setting 1990-2007 10 articles included no studies with RCT design	<ul style="list-style-type: none"> • staff training • pharmacological treatment • mechanical restraint 	<ul style="list-style-type: none"> • patient aggression • staff injuries, staff confidence, knowledge, attitude, stress • early detection of aggressive behaviour 	<ul style="list-style-type: none"> • Lack of high quality studies • Training results in increased knowledge, skills and confidence to manage aggressive situations. (Low) • Medication helps to reduce the incidence of aggressive behaviour in patients in the acute setting (Moderate) • in acute care setting mechanical restraints have minimal complications when used for short periods of time (Low)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2013(62)	front-line healthcare worker nursing, US	Level 3 Low	Literature Review: Workplace violence prevention: improving front-line healthcare worker safety.	<ul style="list-style-type: none"> Flagging patient with history of violence against staff Training: e.g. web based NIOSH training Workplace Violence Prevention Program: WVPP 	<ul style="list-style-type: none"> reduction in assault by the patient 	<ul style="list-style-type: none"> Lack of high quality studies 90% reduction in assaults by flagging high risk patients in veteran health care (Moderate) Training is necessary but there is little evidence on impact Complex and mixed findings on effect of WVPP
Runyan, 2000 (30)	Medical Health Care	Level 3 Low	Systematic Review <ul style="list-style-type: none"> studies included were mainly pre- and post - test study design No studies with RCT design 	Behavioural interventions Administrative interventions	<ul style="list-style-type: none"> 41 papers: Sensible Recommended Interventions but no hard data 9 articles reported results of intervention evaluations 	<ul style="list-style-type: none"> Haddon Matrix overall, the research designs employed were weak and the results inconclusive. None used experimental designs Results: <ul style="list-style-type: none"> decline in frequency of assaults after implementation of a peer help program for assaulted staff (Low) unavailability of debriefing counselling was associated with increased reports of post traumatic stress (Moderate). training program: conflicting evidence : <ul style="list-style-type: none"> psychiatric setting: training in aggression control technique: likelihood of assault 3% versus 37% in non-trained, but potential bias associated with decision to be trained (Low) no significant differences in assault related injuries

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						between trained and untrained group (Low) <ul style="list-style-type: none"> psychiatric setting : no significant difference in number of injuries reported from pre- and post test 4 day training (Low) flagging patients with repeated history of violent events 90% reduction in assault by high risk patients in Veterans Administration hospital (Moderate) quality management approach: improvements in inpatient violence.: e.g. 40% reduction in mealtime incidents after changes in lunchroom procedures. (Low)
Price , 2015 (26)	mental health setting mainly nurses Psy	Level 2 Moderate	Systematic Review: 38 relevant studies Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression <ul style="list-style-type: none"> 23 uncontrolled cohort studies 12 controlled cohort studies 3 case control studies 	<ul style="list-style-type: none"> training on violence including de-escalation technique 	<ul style="list-style-type: none"> cognitive outcome affective outcome behaviour change reduced escalations, reduced assault rates, reduced usage containment 	<ul style="list-style-type: none"> Quality of studies moderate to weak Cognitive outcome: enhanced de-escalation knowledge gain (ES: 0.91, 1.13, 1.39), (Moderate) Affective outcome: increased confidence to manage aggression, ES: <0.2, 0.76, 1.04 (Moderate). No evidence on subjective anxiety regulation. Skills: improved de-escalation performance: ES >0.8 (Moderate) Assault rates: mixed outcomes: 3 studies with reduced risk of assault, 2 studies with no significant effect.

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Reference	Setting	Level/Grade	Study design	Intervention	Outcome	Results (Grade)
			<ul style="list-style-type: none"> No studies with RCT design 			<ul style="list-style-type: none"> Incidence of aggression: mixed outcomes with increases in aggression possibly due to increased reporting. Significant reduction in incident rates measured at ward level: ES 0.64 Injuries: mixed outcomes. Positive effects in reducing injuries at ward level, not at individual staff level: ES 1.13 Containment: reduced use of physical restraint (Low). non significant reduction in use of rapid tranquilisation (Low), no effect on supply of extra medication (Low) Organisational: reduction in lost workdays: ES 1.47 (Moderate)
Wassell, 2009 (63)	GEN Retail industry	Level 3 Low	Systematic Review Workplace Violence intervention effectiveness	<ul style="list-style-type: none"> interventions in health care and retail industry 		Although the article provides a good overview of the published literature, a more in-depth reporting of the relevant underlying studies is provided in the current systematic review
Morphet, 2018 (64)	GEN		<ul style="list-style-type: none"> Scoping Review Prevention and management of occupational violence and aggression in health care 	<ul style="list-style-type: none"> environmental risk management consumer risk assessment staff education 	<ul style="list-style-type: none"> 20 selected articles 	A more in-depth reporting of the relevant underlying studies is provided in the current systematic review.

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7.	In front of risk of violence, the safety of patients, staff and other patients should be presumed.
				8.	If restraint and seclusion are necessary, not only proper monitoring but the use of quality indicators should be also undertaken.
				9.	In the case of physical restraint, vigilant documented monitoring should be mandatory. Vital signs should be measured every 15 min for 60 min and then every 30 min for 4 h or until awake.
				10.	Physical restraint should be removed as soon as the patient is assessed to not to be dangerous anymore for him/herself and/or others.
				11.	Non-invasive treatments should be preferred over invasive treatments whenever possible.
				12.	Agitated patients should be as much as possible involved in both the selection of the type and the route of administration of any medication.
				13.	The main goal of pharmacological treatment should be to rapidly calm the agitated patient without over-sedation.
				14.	When planning involuntary pharmacological treatment team consent should be reached and the action carefully prepared.
				15.	Oral medications, including solutions and dissolving tablets, should be preferred to intramuscular route in mildly agitated patient.
				16.	A rapid onset of the effect and the reliability of delivery are the two most important factors to consider in choosing a route of administration for the treatment of severe agitation.
				17.	In the case of agitation secondary to alcohol withdrawal treatment with benzodiazepines should be preferred over treatment with antipsychotics.
				18.	In the case of agitation associated with alcohol intoxication, treatment with antipsychotics should be preferred over treatment with benzodiazepines.
				19.	In mild-to-moderate agitation, and when rapid effects of medication are needed, inhaled formulations of antipsychotics may be considered.
				20.	The concomitant use of intramuscular olanzapine and benzodiazepines should be avoided, due to the possible dangerous effects induced by the interaction of the two medications in combination (hypotension, bradycardia, and respiratory depression).
				21.	Intravenous treatment should be avoided except in cases where there is no alternative.

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
wright, 2003 (20)	General practice, UK	Medium	Systematic Review Prevalence and management of violence in primary care	“	22. Elderly agitated patients should be treated with lower doses: usually between a quarter and a half of the standard adult dose. (31)
				• Management of violence in Primary care should focus on structural risk factors and interaction at individual level between patient and clinician • Establish a collaborative practice approach. • Be aware of the specific risks for verbal abuse and threats of violence towards the receptionists. • Risk factors are not static but vary according to time, place and situation. • GPs should use their knowledge of the patient to form part of risk assessment. • Perceived risk of violence can exceed the real absolute risk. Balance the risk of excluding patients from primary care versus staff safety Do: • Provide panic alarms. • Use a critical incident recording system. • Ensure that waiting area can be seen from the reception desk. • Provide a means of escape that does not involve the path of the patient. • Consult with another team member if conflict is anticipated. • Call the police if an abusive situation seems likely to become violent. • Reflect on one's own behaviour after each critical incident. • Remove a patient from the list only as a last resort. • Encourage all team members to 'own' the potential problem of violence. Do Not: • Use grilles, barriers, or glass screens inappropriately. • Leave it to someone else to attend to the problem. • Use physical force to restrain. • Always see yourself as 'right' and the other party as 'wrong" (20)	
Phillips, 2016 (21)	Health Care different settings, US	Medium	Review article • prevalence of WPV type II • Non hospital setting • Hospital setting • Barriers to reporting • Risk Factors		• Although metal detectors may theoretically mitigate violence in the health care workplace, there is no concrete evidence to support this expectation • Lack of supporting evidence on efficacy of preventive measures • Difficulty in designing experiments to test hypothetical interventions • Multifaceted, multidisciplinary approach is necessary and any prevention program requires individualization and customization. • "Recommendations that have been proposed:

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			<ul style="list-style-type: none"> metal detectors guidelines potential solutions 	<ul style="list-style-type: none"> training in de-escalation techniques and training in self-defence target hardening of infrastructure: security cameras, fences, metal detectors, hiring of guards health care organizations: improve staffing levels during busy periods to reduce crowding and wait times, decrease worker turnover and provide adequate security and mental health personnel on site reporting and redress: verbal assault has been shown to be a risk factor for battery. "The broken window principle": a criminal justice theory that apathy toward low-level crimes creates a neighborhood conducive to more serious crime also applies to workplace violence. "Zero tolerance policy" may prevent escalation." (21) 	
Wax, 2016 (65)	health care US	not applicable	Review Workplace Violence in Health Care: It's Not "Part of the Job".	<ul style="list-style-type: none"> Prevalence: health care workers comprise only 3% of US workforce but experience 60% of all workplace assaults Types of workplace violence Contributors to WPV: see discussion on risk factors Consequences of WPV in healthcare Guideline summary: OSHA(66) Responding to active shooter incident: "run, hide, fight" approach. The human, societal and economic costs of health care WPV are enormous and unacceptable. There are opportunities for professional physician organizations to establish clear policy statements on WPV, to support education on WPV and to assist collaborative state legislative efforts . 	
Gillespie, 2010 (22)	health care workers US	Medium	literature review: Workplace Violence in Healthcare Settings: Risk Factors and Protective Strategies	<ul style="list-style-type: none"> Environmental risk factors: controlled access to patient areas, reduced wait times, security presence, escorting workers to vehicle, security presence, video monitors, cell phone or personal alarm, Organizational policies, zero-tolerance policy. After violent event: support from co-workers, management, debriefing, professional counselling, re-assigning patients when feasible General practitioner: documentation of after hours destination, no house calls to unfamiliar patients. Instructing unknown patients or patients with history of violence to seek health care with a different provider Communication of location at regular intervals with a unit coordinator and a plan to be activated on failure to do so. 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Robson, 2007 (38)	general OHSAS system effectiveness different industrial sectors	Medium	systematic review The effectiveness of occupational health and safety management system interventions 13 selected studies	<ul style="list-style-type: none"> • Violence-prevention training on hiring and regular updates ; including recognizing stress in oneself or in patients, de-escalation techniques. • Effective violence-prevention program • Limiting visitor access to 2 persons 	<ul style="list-style-type: none"> • See discussion • Relatively small quantity of published peer reviewed evidence involving occupational health and safety managements system interventions • Synthesis of evidence showed mostly favourable results, there were a few null findings but no findings of negative effects. • All but one of the studies included had moderate methodological limitations. • Despite the generally positive results on effectiveness of occupational health and safety managements system interventions, the evidence is insufficient to make recommendations either in favour or against .

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Overview of relevant guidelines

Table 4 Guidelines

		Country
Occupational Safety and Health Administration, 2016 (66)	Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers	US
Wiskow, 2003(67)	Guidelines on workplace violence in health sector	comparison of different guidelines
The Royal Australian College of General Practitioners, 2015 (55)	General practice – A safe place A guide for the prevention and management of patient-initiated violence	Australia
WorksafeVictoria, 2017 (56)	Prevention and management of violence and aggression in health services	Australia
NICE, 2015 (68)	Violence and aggression: short-term management in mental health, health and community settings NICE, 2015	UK
FOD Binnenlandse Zaken & FOD Volksgezondheid, 2009(69)	een veilige dokterspraktijk	Belgium
Een veilige dokterspraktijk, 2017(70)	Veiligheid voor huisartsen , toolbox 1	

Table 5 risk factors that increase the risk of occupational violence

(54), (62), (53), (31), (71), (23), (65), (57), (19), (34), (4),(21),(59),(20),(22),(72)

Workplace design	<ul style="list-style-type: none"> • Poor delineation between staff-only area and patient area • Lack of controls in accessing staff-only and patient areas • Overcrowded, uncomfortable or noisy waiting rooms • Poor access to exits, toilets and amenities • Poor lighting, blind spots without surveillance • Unsecured furnishings that can be used as weapons
Policies and Work practices	<ul style="list-style-type: none"> • Increased waiting times • Poor customer services from staff • Deficit in staffing levels or inadequate skills mix • Working alone • Lack of violence-prevention programs • Lack of staff empowerment and shared governance • Lack of follow up of violent episodes by management • Poor safety culture: “broken window principle” • Ineffective mechanisms to warn and ultimately deny service to patients with repeated behaviours of concern • Lack of staff training in de-escalation techniques, • Lack of staff training in etiology and treatment of various pathologies associated with violent behaviour • Use of physical restraints • Mismatch between expectations and services offered: e.g. demands for classified drugs • Presence of drugs, cash or valuable items in the office • Presence of weapons • Refusal to provide a prescription or a sickness or disability certificate • On-call shifts/house visits
Patient factors	<ul style="list-style-type: none"> • Current illness with physiological imbalances or disturbances: <ul style="list-style-type: none"> ○ head trauma ○ encephalitis, meningitis, infection ○ encephalopathy ○ metabolic derangement: hyponatremia, hypocalcemia, hypoglycemia ○ hypoxia ○ thyroid disease ○ seizure (postictal) ○ exposure to environmental toxins ○ toxic levels of medications • Active intoxication, substance dependence, misuse or abuse • Psychosocial stressors • Previous poor experiences with healthcare services • Past history of violence • Psychiatric disorder • Personality, interpersonal style of control or dominance • Frustration , perception not being respected, not being listened to or being treated unfairly • Stress, agitation • Loss of situational control

	<ul style="list-style-type: none"> • Unexpected or high costs of health care • Complex family relationships
Physicians factors	<ul style="list-style-type: none"> • Being unprepared • Education and training: being aware of own body language, knowing how to de-escalate, knowing how to escape • Medical skills • Communication skills • Less years of experience • Physicians own emotions, anger, anxiety, countertransference • Overworked, stressed • Interpersonal style: e.g. assertive style by the physician may challenge the patient's sense of dominance and lead to discomfort and frustration • Gender: no difference in overall risk of violence, increased risk within younger, male GPs for physical assaults • Vulnerability in being a source of risk with respect to legal or licensing matters e.g. with information to third parties beyond direct patient care • Vulnerability : where does the duty of care end in the face of potential violence • Personality traits with increased risk: low agreeableness, high neuroticism, high negative affect, low extroversion, low conscientiousness, low self-esteem
Societal causes / Social context	<ul style="list-style-type: none"> • Poverty, unemployment and social dislocation • Reduced respect for authority, patients are having a greater sense of entitlement than in past and as a consequence frustration in not getting response to demands potentially leads to violence • "Bowling for Columbine effect": spiral of fearfulness, suspicion leading to pre-emptive defensiveness, confrontation and ultimately a greater risk of violence • Population density • Language barriers • Cultural differences

References

1. Hills DJ, Joyce CM, Humphreys JS. A national study of workplace aggression in Australian clinical medical practice. *Med J Aust* [Internet]. 2012;197(6):336–40. Available from: <https://www.mja.com.au/journal/2012/197/6/national-study-workplace-aggression-australian-clinical-medical-practice>
2. Elston MA, Gabe J. Violence in general practice: A gendered risk? *Sociol Heal Illn*. 2016;38(3):426–41.
3. Demeur V, Devos S, Jans E. Agressie tegen de huisarts: De arts in nood. Het profiel van de kwetsbare huisarts. KU LEUVEN; 2017.
4. Vorderwülbecke F, Feistle M, Mehring M, Schneider A, Linde K. Aggression and Violence Against Primary Care Physicians—a Nationwide Questionnaire Survey. *Dtsch Arztebl Int*. 2015;112(10):159–65.
5. Nikathil S, Olausson A, Gocentas RA, Symons E, Mitra B. Review article: Workplace violence in the emergency department: A systematic review and meta analysis. *Emerg Med Australas* [Internet]. 2017;29(3):265–75. Available from: <http://doi.wiley.com/10.1111/1742-6723.12761>
6. Kowalenko T, Cunningham R, Sachs CJ, Gore R, Barata IA, Gates D, et al. Workplace violence in emergency medicine: Current knowledge and future directions. *J Emerg Med* [Internet]. Elsevier Ltd; 2012;43(3):523–31. Available from: <http://dx.doi.org/10.1016/j.jemermed.2012.02.056>
7. Arnetz, Judith E, Lydia H, Russell J. Preventing patient-to-worker violence in hospitals: outcome of a randomized controlled intervention. *59(1):18–27*.
8. Moher D, Liberati A, Tetzlaff J, Altman DG, Altman D, Antes G, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;6(7).
9. Higgins JPT GS. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0* The Cochrane Collaboration [Internet]. 2011. Available from: www.handbook.cochrane.org
10. OCEBM Levels of Evidence Working Group, Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, et al. *The Oxford 2011 Levels of Evidence 2*. 2011; Available from: <http://www.cebm.net/index.aspx?o=1025>
11. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schunemann HJ. GRADE: What is “quality of evidence” and why is it important to clinicians? *Bmj*. 2008;336(may):995-8-995-8.
12. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;336(1):924(3).
13. Lewin S, Booth A, Glenton C, Munthe-Kaas H, Rashidian A, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: Introduction to the series. 2018;13(Suppl 1):1–10.
14. Arnetz JE, Hamblin L, Russell J, Upfal MJ, Luborsky M, Janisse J, et al. Preventing Patient-to-Worker Violence in Hospitals: Outcome of a Randomized Controlled Intervention. *J Occup Environ Med*. 2017;59(1):18–27.
15. Lipscomb J, Mcphaul K, Rosen J, Brown JG, Choi M, Soeken K, et al. Violence Prevention in the Mental Health Setting: The New York State Experience. 2006;38:96–117.
16. Mohr DC, Warren N, Hodgson MJ, Drummond DJ. Assault rates and implementation of a workplace violence prevention program in the veterans health care administration. *J Occup Environ Med*. 2011;53(5):511–6.
17. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy : a repeated cross-sectional study. *BMC Health Serv Res*. 2012;
18. Henson B. Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory. *Violence Vict* [Internet]. 2010;25(4):553–65. Available from: <http://openurl.ingenta.com/content/xref?genre=article&issn=0886-6708&volume=25&issue=4&spage=553>

19. Magin P, Adams J, Joy E, Ireland M, Heaney S, Darab S. Violence in general practice: Perceptions of cause and implications for safety. *Can Fam Physician*. 2008;54(9):1278–84.
20. Wright NMJ, Dixon CAJ, Tompkins CNE. Managing violence in primary care: An evidence-based approach. *Br J Gen Pract*. 2003;53(492):557–62.
21. Phillips JP. Workplace Violence against Health Care Workers in the United States. *N Engl J Med* [Internet]. 2016;374(17):1661–9. Available from: <http://www.nejm.org/doi/10.1056/NEJMra1501998>
22. Gillespie GL, Gates DM, Miller M, Howard PK. Workplace violence in healthcare settings: risk factors and protective strategies. *Rehabil Nurs*. 2010;35(5):177–84.
23. Sim MG, Wain T, Khong E. Aggressive behaviour: Prevention and management in the general practice environment. *Aust Fam Physician*. 2011;40(11):866–72.
24. Ifediora C. Exploring the safety measures by doctors on after-hours house call services. *Australas Med J*. 2015;8(7):239–46.
25. Morken T, Johansen IH. Safety measures to prevent workplace violence in emergency primary care centres – a cross-sectional study. *BMC Health Serv Res* [Internet]. *BMC Health Services Research*; 2013;13(1):1. Available from: *BMC Health Services Research*
26. Price O, Baker J, Bee P, Lovell K. Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry* [Internet]. 2015;206(6):447–55. Available from: <http://bjp.rcpsych.org/cgi/doi/10.1192/bjp.bp.114.144576>
27. Price O, Baker J. Key components of de-escalation techniques: A thematic synthesis. *Int J Ment Health Nurs*. 2012;21(4):310–9.
28. Saragoza P, White SG. Workplace Violence: Practical Considerations for Mental Health Professionals in Consultation, Assessment, and Management of Risk. *Psychiatr Clin North Am* [Internet]. Elsevier Inc; 2016;39(4):599–610. Available from: <http://dx.doi.org/10.1016/j.psc.2016.07.007>
29. Abderhalden C, Needham I, Dassen T, Halfens R, Haug HJ, Fischer JE. Structured risk assessment and violence in acute psychiatric wards: RCT. *Br J Psychiatry*. 2008;193(1):44–50.
30. Runyan CW, Zakocs RC, Zwerling C. Administrative and behavioral interventions for workplace violence prevention. *Am J Prev Med* [Internet]. 2000;18(4):116–27. Available from: <http://www.sciencedirect.com/science/article/pii/S0749379700001471>
31. Garriga M, Pacchiarotti I, Kasper S, Zeller SL, Allen MH, Vázquez G, et al. Assessment and management of agitation in psychiatry: Expert consensus. *World J Biol Psychiatry*. 2016;17(2):86–128.
32. Richmond J, Berlin J, Fishkind A, Holloman G, Zeller S, Wilson M, et al. Verbal De-escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. *West J Emerg Med* [Internet]. 2012;13(1):17–25. Available from: <http://www.escholarship.org/uc/item/55g994m6>
33. Kohlrieser G. Hostage at the table. *Jossy-Bass*; 2006.
34. Geoffrion S, Lanctôt N, Marchand A, Boyer R, Guay S. Predictors of trivialization of workplace violence among healthcare workers and law enforcers. *J Threat Assess Manag* [Internet]. 2015;2(3–4):195–213. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/tam0000048>
35. Naish J, Carter YH, Gray RW, Stevens T, Tissier JM, Gantley MM. Brief encounters of aggression and violence in primary care: a team approach to coping strategies. *Fam Pract* [Internet]. 2002;19(5):504–10. Available from: <http://fampra.oxfordjournals.org/content/19/5/504.abstract%5Cnhttp://fampra.oxfordjournals.org/content/19/5/504.full.pdf>
36. Schat ACH, Kelloway EK. Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. *J Occup Health Psychol* [Internet]. 2003;8(2):110–22. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/1076-8998.8.2.110>

- 1
- 2
- 3 37. Magnavita N. Violence Prevention in a Small-scale Psychiatric Unit: Program Planning and
- 4 Evaluation. *Int J Occup Environ Health*. 2011;17(4):336–44.
- 5 38. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of
- 6 occupational health and safety management system interventions: A systematic review. *Saf*
- 7 *Sci*. 2007;45(3):329–53.
- 8 39. James S, Cawood C. *Violence Assessment and Intervention: The Practitioner’s Handbook*,
- 9 *Second Edition*. 2009. 377 p.
- 10 40. Runyan CW. Moving forward with research on the prevention of violence against workers. *Am*
- 11 *J Prev Med*. 2001;20(2):169–72.
- 12 41. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical intervention programme
- 13 for dealing with violence towards health care workers. *J Adv Nurs*. 2000;31(3):668–80.
- 14 42. Arnetz JE, Hamblin L, Ager J, Aranyos D, Upfal MJ, Luborsky M, et al. Application and
- 15 implementation of the hazard risk matrix to identify hospital workplaces at risk for violence.
- 16 *Am J Ind Med*. 2014;57(11):1276–84.
- 17 43. Rogers P, Miller G, Paterson B, Bonnett C, Turner P, Brett S, et al. Is breakaway training
- 18 effective? Examining the evidence and the reality. *J Ment Heal Training, Educ Pract*.
- 19 2007;2(2):5–12.
- 20 44. Hvidhjelm J, Sestoft D, Skovgaard LT, Bjorner JB. Sensitivity and specificity of the Broset
- 21 Violence Checklist as predictor of violence in forensic psychiatry. *Nord J Psychiatry*.
- 22 2014;68(8):536–42.
- 23 45. Partridge B, Affleck J. Predicting aggressive patient behaviour in a hospital emergency
- 24 department: An empirical study of security officers using the Brøset Violence Checklist.
- 25 *Australas Emerg Care [Internet]*. College of Emergency Nursing Australasia; 2018;21(1):31–5.
- 26 Available from: <http://linkinghub.elsevier.com/retrieve/pii/S2588994X17300039>
- 27 46. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: A cross-sectional
- 28 study. *Scand J Prim Health Care*. 2012;30(1):55–60.
- 29 47. Nau J, Dassen T, Needham I, Halfens R. The development and testing of a training course in
- 30 aggression for nursing students: A pre-and post-test study. *Nurse Educ Today [Internet]*.
- 31 Elsevier Ltd; 2009;29(2):196–207. Available from:
- 32 <http://dx.doi.org/10.1016/j.nedt.2008.08.011>
- 33 48. Hills DJ, Joyce CM, Humphreys JS. Workplace aggression prevention and minimisation in
- 34 Australian clinical medical practice settings - A national study. *Aust Heal Rev*. 2013;37(5):607–
- 35 13.
- 36 49. Gillespie GL, Gates DM, Mentzel T, Al-Natour A, Kowalenko T. Evaluation of a comprehensive
- 37 ED violence prevention program. *J Emerg Nurs [Internet]*. Emergency Nurses Association.
- 38 Published by Elsevier Inc. All rights reserved.; 2013;39(4):376–83. Available from:
- 39 <http://dx.doi.org/10.1016/j.jen.2012.12.010>
- 40 50. Holloman G, Zeller S. Overview of Project BETA: Best Practices in Evaluation and Treatment of
- 41 Agitation. *West J Emerg Med [Internet]*. 2012;13(1):1–2. Available from:
- 42 <http://www.escholarship.org/uc/item/4kz5387b>
- 43 51. Stowell K, Florence P, Harman H, Glick R. Psychiatric Evaluation of the Agitated Patient:
- 44 Consensus Statement of the American Association for Emergency Psychiatry Project BETA
- 45 Psychiatric Evaluation Workgroup. *West J Emerg Med [Internet]*. 2012;13(1):11–6. Available
- 46 from: <http://www.escholarship.org/uc/item/9t41z4rb>
- 47 52. Wilson M, Pepper D, Currier G. The psychopharmacology of agitation: consensus statement of
- 48 the American association for emergency psychiatry project. BETA psychopharmacology
- 49 workgroup. *West J Emerg Med [Internet]*. 2012;13(6):536–7. Available from:
- 50 <http://www.escholarship.org/uc/item/2gm874n6>
- 51 53. Morken T, Johansen IH, Alsaker K. Dealing with workplace violence in emergency primary
- 52 health care : a focus group study. *BMC Fam Pract*. 2015;1–7.
- 53 54. Aydin B. Violence Against Practitioners in Turkey. 2009;1980–95.
- 54 55. The Royal Australian College of General Practitioners. *General practice – A safe place. A guide*
- 55

- for the prevention and management of patient-initiated violence. [Internet]. 2015. Available from: <http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-tipsandtools.pdf>
56. WorkSafe Victoria. Prevention and management of violence and aggression in health services. 2017;(2).
57. Zhao S, Qu L, Liu H, Gao L, Jiao M, Liu J, et al. Coping with Workplace Violence against General Practitioners and Nurses in Heilongjiang Province, China: Social Supports and Prevention Strategies. *PLoS One*. 2016;11(6):1–14.
58. Magin P. General practice as a fortress. *Aust Fam Physician*. 2010;39(11).
59. Magin P, Adams J, Joy E. Occupational violence in general practice. *Aust Fam Physician*. 2007;36(11):955–7.
60. Calow N, Lewis A, Showen S, Hall N. Literature Synthesis: Patient Aggression Risk Assessment Tools in the Emergency Department. *J Emerg Nurs* [Internet]. Emergency Nurses Association; 2016;42(1):19–24. Available from: <http://dx.doi.org/10.1016/j.jen.2015.01.023>
61. Kynoch K, Wu CJ, Chang AM. Interventions for preventing and managing aggressive patients admitted to an acute hospital setting: A systematic review. *Worldviews Evidence-Based Nurs*. 2011;8(2):76–86.
62. Lipscomb JA, El Ghaziri M. Workplace Violence Prevention: Improving Front-Line Health-Care Worker and Patient Safety. *NEW Solut A J Environ Occup Heal Policy* [Internet]. 2013;23(2):297–313. Available from: <http://journals.sagepub.com/doi/10.2190/NS.23.2.f>
63. Wassell JT. Workplace violence intervention effectiveness: A systematic literature review. *Saf Sci* [Internet]. Elsevier Ltd; 2009;47(8):1049–55. Available from: <http://dx.doi.org/10.1016/j.ssci.2008.12.001>
64. Morphet J, Griffiths D, Beattie J, Velasquez Reyes D, Innes K. Prevention and management of occupational violence and aggression in healthcare: A scoping review. *Collegian* [Internet]. Australian College of Nursing Ltd; 2018; Available from: <https://doi.org/10.1016/j.colegn.2018.04.003>
65. Wax JR, Pinette MG, Cartin A. Workplace Violence in Health Care-It's Not "Part of the Job". *Obstet Gynecol Surv* [Internet]. 2016;71(7):427–34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27436177>
66. Occupational Safety and Health Administration. Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers. 2016;1–53. Available from: <https://www.osha.gov/Publications/OSHA3148.pdf>
67. Wiskow C. Guidelines on Workplace Violence in the Health Sector, Comparison of major known national guidelines and strategies. *Strategies*. 2003;
68. NICE. Violence and Aggression, Short-Term Management in Mental Health, Health and Community Settings: Updated edition [Internet]. Violence and Aggression: Short-Term Management in Mental Health, Health and Community Settings: Updated edition. 2015. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26180871>
69. FOD Binnenlandse Zaken, FOD Volksgezondheid. Veiligheid voor huisartsen. 2009; Available from: <http://www.veiligheidvanartsen.be/>
70. Een veilige dokterspraktijk [Internet]. 2017. Available from: <https://www.besafe.be/publicaties/een-veilige-dokterspraktijk>
71. Daffern M, Day A, Cookson A. Implications for the prevention of aggressive behavior within psychiatric hospitals drawn from interpersonal communication theory. *Int J Offender Ther Comp Criminol*. 2012;56(3):401–19.
72. Landau SF, Bendalak J, Amitay G, Marcus O. Factors related to negative feelings experienced by emergency department patients and accompanying persons: An Israeli study. *Isr J Health Policy Res*. *Israel Journal of Health Policy Research*; 2018;7(1):1–9.

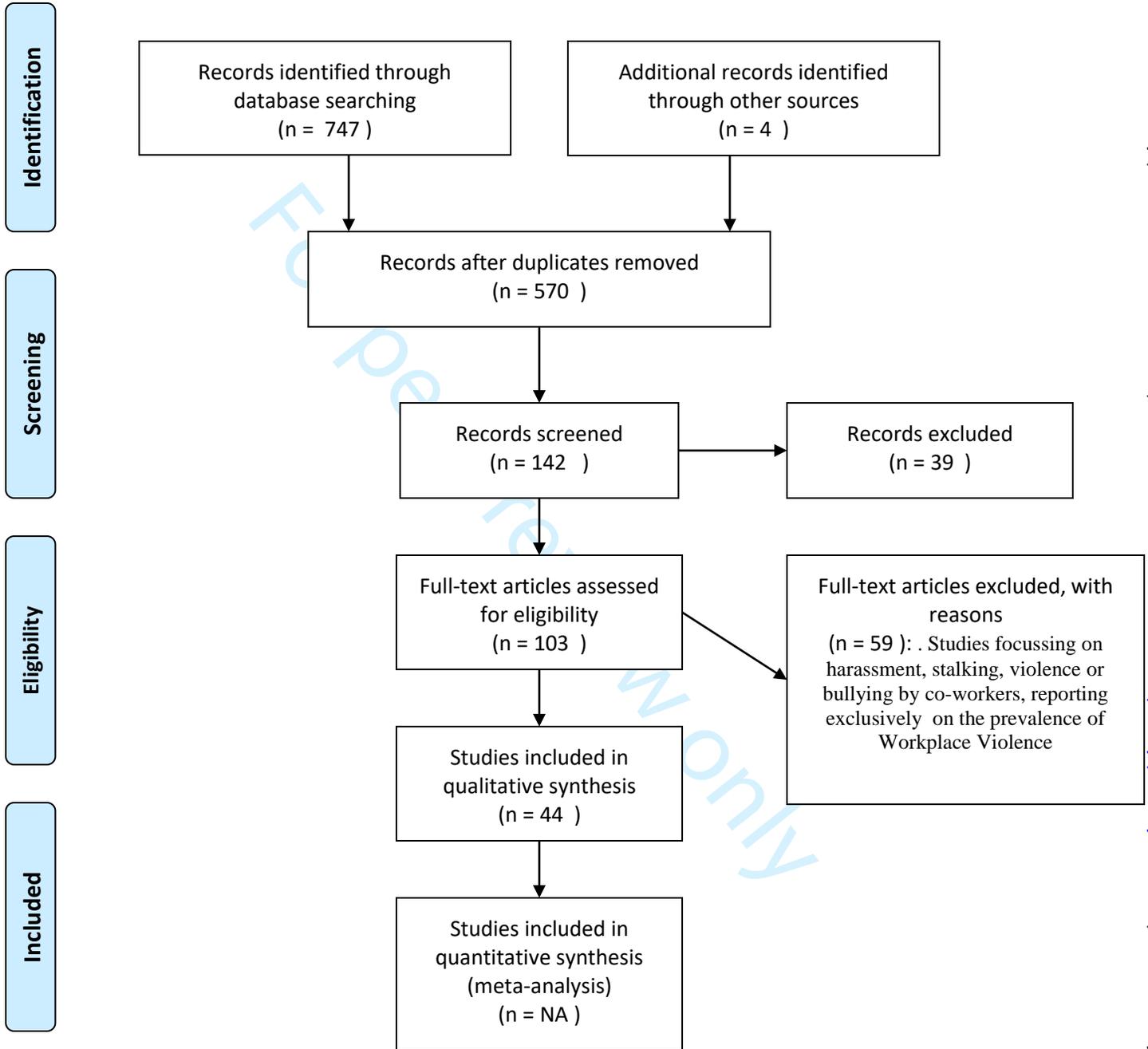
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Figure 1: Prisma Flow diagram record screening and inclusion

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PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Supplementary Materials: Interventions to prevent aggression against doctors: A Systematic Review

Appendix 1

Details of search strategy						
I preliminary search 3-6 February 2018						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
1	pubmed 3 Feb. 2018	((("physician"[Title/Abstract] OR "general practitioner"[Title/Abstract]) OR "doctor"[Title/Abstract]) AND "aggression"[Title/Abstract])	153	44		
2	pubmed 3 Feb 2018	((("physician"[Title] OR "general practitioner"[Title]) OR "doctor"[Title]) AND "violence"[Title])	79	17		
3	embase 4 Feb 2018	'physician':ab,ti OR 'general practitioner':ab,ti) AND 'aggression':ab,ti	145			
4	embase 6 Feb 2018	Query'physician'/mj AND 'violence'/mj NOT 'domestic violence'/exp Mapped terms"domestic violence" mapped to 'domestic violence', term is exploded articles and review	68			
5	TRIP 4 Feb 2018	physician violence	261	2		
6	Cochrane 4 Feb 2018	"workplace" in Title, Abstract, Keywords and violence in Title, Abstract, Keywords in Other Reviews'	17	0	0	
7	ebmpractice 4 Feb 2018	geweld, agressie	1	1	1	
8	crd 4 Feb 2018	Results for: (violence):TI NOT (domestic):TI NOT (partner):TI IN DARE	23	3		
	<i>subtotal</i>		747	67	46	12
II Systematic Search						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
0	pubmed 15 Feb 2018	Search (((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND prevent*[Title/Abstract] Sort by: Best Mat	53	24	8	4
1	pubmed 15 Feb 2018	((("Workplace Violence"[Mesh]) OR "Aggression"[Mesh]) AND "Health Care Sector"[Mesh])	8	8	3	3
2	pubmed 15 Feb 2018	((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (	19	10	6-3 double =3	0

		"1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND intervent*[Title/Abstract]				
3	pubmed 15 Feb 2018	((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (" 1999/12/31"[PDat] : "2018/02/15"[PDat]))))) AND strateg*[Title/Abstract])	34	8	8-6 double= 2	0
4	pubmed 15 Feb 2018	Search (((((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms])) AND Review[ptyp] AND "last 10 years"[PDat])) NOT domestic violence[MeSH Terms]) AND Review[ptyp] AND "last 10 years"[PDat])) AND prevent*[Title/Abstract]) AND Review[ptyp] AND "last 10 years"[PDat])) AND Review[ptyp] AND "last 10 years"[PDat] AND Humans[Mesh])) NOT youth[MeSH Terms]) NOT abuse, partner[MeSH Terms] Sort by: Best Match Filters: Review; published in the last 10 years; Humans	272	24	14+ 4 snowball -3 double =15	12
5	pubmed 15 Feb 2018	Search (((("General Practitioners"[Mesh]) OR "General Practice"[Mesh]) AND "Violence"[Mesh])) NOT domestic violence[MeSH Terms] Sort by: Best Match Filters: Humans; English	158	46	13-2 double =11	6
6	psycharticle 14 Feb 2018	((ti(aggression) OR ti(violence)) NOT ti(partner) NOT ti(domestic)) AND ti(physician) OR ti(doctor) OR ti(workplace)	26	22	11	3
	extra				4	4
	<i>subtotal</i>		570	142	57	32
	Total				103	44



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I ²) for each meta-analysis.	NA



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4-5 and appendix
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Tables
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Tables
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Tables 4-6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	9
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Page 2 of 2

BMJ Open

Interventions to prevent aggression against doctors: A Systematic Review

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Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Ethics, Health services research
Keywords:	aggression, general practitioner, workplace violence, interventions

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Manuscripts

Title: Interventions to prevent aggression against doctors: A

Systematic Review

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All authors contributed in a proportionate way to the research and the completion of the manuscript

Interventions to prevent aggression against doctors, a Systematic Review

Abstract

Objective: To find out if there is evidence on interventions to prevent aggression against doctors.

Design: This systematic review searched the literature and reported in accordance with PRISMA-guidelines.

Data sources: Pubmed, Embase, TRIP, Cochrane and Psycharticle , GoogleScholar and www.guideline.gov were consulted.

Eligibility Criteria: Abstracts published in English between January 2000 and January 2018 were screened. Eligible studies focussed on prevention and risk factors of type II Workplace Violence in General Healthcare, Psychiatric departments, Emergency Departments, Emergency Primary Care, General Practise.

Data extraction and synthesis: The selected intervention studies were grouped into quantitative and qualitative studies. Systematic Reviews were reported separately. For each study, the design, type of intervention and key findings were analysed. Quality rating was bases on GRADE and GRADE-CERQUAL.

Results: 44 studies are included. One RCT provided moderate evidence that a Violence Prevention Programme was effective in decreasing risks of violence. Major risk factors are long waiting times, discrepancy between patients' expectations and services, substance abuse by the patient and a psychiatric condition. Appropriate workplace design and work policies aim to reduce risk factors but there is no hard evidence on the effectiveness. One RCT provided evidence that a patient risk assessment combined with tailored actions decreased severe aggression events in psychiatric wards. Applying de-escalation techniques during an event of aggression is highly recommended. Post-incident reporting followed by root cause analysis of the incident provides the basic input for review and optimisation of the Violence Prevention Programme.

Discussion: This review documented interventions to prevent and de-escalate aggression against doctors. The review failed to gather sufficient numeric data to perform a meta-analysis due to heterogeneity in population, intervention and study design.

Interpretation. Aggression against physicians is a serious occupational hazard. There is moderate evidence that an integrated Violence Prevention Programme can decrease the risks of patient-to-worker violence.

Strengths and limitations of this study

- As compared to other reviews, this review succeeded in inventorying and documenting all known interventions to prevent and de-escalate aggression against doctors
- As many medical databases were consulted and the harvest of articles was compared to previous comprehensive reviews
- Research in this area requires quantitative and qualitative methodological approaches and there for all types of publications were included
- The review failed to gather sufficient numeric data to perform a meta-analysis

Keywords: aggression, workplace violence, interventions, doctors, general practitioner

Word count 3847

Introduction

Aggression against physicians including verbal, physical and psychological aggression is a well-known and serious occupational hazard. The prevalence of violence in health care is extensively documented through large studies in various settings and populations. Subjective interpretation of violent behaviour and underreporting of workplace violence is consistently cited in literature and leads to heterogeneity in results and conclusions.

A large, nationwide Australian study (MABEL) reported on the 12-month prevalence of verbal or written and physical aggression in Australian clinical medical practise: 70.6% of 9951 Australian doctors experienced verbal or written aggression and 32.3% experienced physical aggression in the previous 12 months. More specifically the 12 month prevalence of verbal aggression towards general practitioners was 54.9%, the physical aggression was 23.4%.⁽¹⁾ In a survey in the UK 78% of all GPs experienced at least one verbal incident in the previous 2 years.⁽²⁾ A recent cross-sectional study among Flemish General Practitioners (GPs) showed that only about 5% of GPs never encountered aggression. Most frequently the aggression was verbally however, about 20% reported physical aggression and almost 8% report sexual aggression.⁽³⁾

A recent nationwide German Survey reported that 91% of GPs had been object of aggression in their career and 73% in the previous 12 months.⁽⁴⁾ Typically, the highest rates of physical aggression were found in emergency departments and in psychiatric units. A recent Systematic Review and meta-analysis showed a pooled incidence of 36 of every 10 000 presentations to the emergency department of which 44% were associated with drug and alcohol exposure.⁽⁵⁾ More than one quarter of emergency physicians reported that they were victims of physical assault in the past year.⁽⁶⁾ A large RCT in hospital setting identified between 8 and 15 reported violence events per 100 full time equivalents per year in the hospital.⁽⁷⁾

In the health care setting, the most common type of workplace violence is where the perpetrator is the patient or a relative of the patient. These events are categorised in literature as "type II workplace violence". Exposure to work place violence can lead to physical and psychological injury, reduced job satisfaction and detachment and affects the quality of care.

Although the impact of work place related aggression is considerable and well documented, there is no systematic evidence on how to prevent, intervene and approach hazardous situations. Despite the heterogeneity in scientific and event reports about workplace related violence there is consensus that safety action plans should be established and implemented. Therefore, the primary research question in this study is: "What are interventions to prevent aggression against doctors in general and against the general practitioner in particular?"

Methods

This systematic review is performed according to PRISMA guidelines. ⁽⁸⁾ For the randomised controlled studies the risk of bias was assessed and reported using the Cochrane classification scheme for bias.⁽⁹⁾

Eligibility and inclusion Criteria

Abstracts published in English between January 2000 and April 2019 were screened for inclusion. Eligible studies focussed on prevention of type II Workplace Violence: verbal, physical and psychological aggression from a patient or a patient's relative to a health care worker. Studies focussing on 'aggression' by co-workers were excluded.

Qualitative and quantitative intervention studies were included. Systematic reviews and Reviews on prevention strategies were included. Single case reports or opinion articles were excluded.

1
2
3 The target population was defined as a health care worker in General Healthcare, Psychiatric
4 departments, Emergency Departments, Emergency Primary Care, General Practise. Eligible
5 interventions were focussing on risk factors, workplace violence prevention or strategies to reduce
6 workplace violence. Comparison was, as far as present, defined as usual care and strategy in case of
7 the reporting of a hazardous situation.

8 For evaluation of effectiveness of the intervention, the primary outcome of interest was patient
9 aggression towards healthcare workers. Secondary outcomes were risk factors, staff knowledge, staff
10 skills and early detection of aggressive behaviour. Per type of intervention, the major findings were
11 extracted and discussed.
12
13

14 *Search strategy*

15 Databases utilised were Pubmed, Embase, TRIP, Cochrane and Psycharticle with different search
16 strategies (see appendix). The following search terms/Mesh terms were used: aggression, violence,
17 physician, doctor, workplace, prevent*, strateg*, intervent*, general practitioner, health care. The
18 reference list of articles was scanned additionally. A separate search was performed on Google
19 Scholar and www.guideline.gov using the same search terms.
20
21

22 *Data collection and analysis*

23 The selected intervention studies were grouped into two groups: quantitative and qualitative
24 studies. The Systematic Reviews were reported separately. For each selected study, the design, type
25 of intervention and key findings were analysed. A level of evidence was attributed to each
26 quantitative study based on the Oxford 2011 Levels of Evidence (10). The quantitative studies were
27 rated according to the GRADE (11)(12). For the qualitative studies the GRADE-CERQUAL approach
28 was used to assess quality (13).
29
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32 *Patient and Public Involvement*

33 Patients were not actively involved in this literature research. In a prior master thesis research, a
34 need assessment among general practitioners was conducted.
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37

38 *Data availability*

39 Data on the search strategy and the harvest of retrieved articles are available on request.
40
41

42 **Results**

43 The total harvest of articles is presented in appendix 1. In total 105 full text articles were read and
44 assessed for eligibility. 44 studies of which 15 quantitative, 15 qualitative studies, 7 systematic
45 reviews and 7 reviews were included in this review (figure 1).
46
47

48 *Summary of results*

49 The results of the quantitative studies are presented in table 1, those of the qualitative studies in
50 table 2. Table 3 summarises the Systematic Reviews and other Reviews. Table 4 gives an overview of
51 frequently cited guidelines. Table 5 summarises the factors that may increase the risk of Workplace
52 Violence.
53
54

55 *Studies reporting on Interventions*

56 The interventions most frequently discussed and evaluated through are grouped. The first group of
57 interventions was labelled as pre-event preventive measures: components of an integrated violence
58 prevention programme. The second group was labelled as interventions taking place during a violent
59 event: applying de-escalation techniques and activating specific violence emergency procedures. The
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3 third group was labelled as post-incident interventions: incident reporting followed by root cause
4 analysis of the incident and review of violence prevention policy.
5

6 *Pre-event preventive measures*

7 Under this label two types of interventions were identified: violence prevention programmes and
8 risk assessment and risk control measures.
9

10 *Violence Prevention Programmes*

11 A variety of violence prevention programmes has been developed in order to prevent work place
12 violence and to manage and mitigate the impact of violence at work. They all propose an integrated
13 approach incorporating basic elements such as, a worksite risk analysis, hazard prevention and
14 control measures, safety training and education, violent event reporting and evaluation. Some
15 programmes explicitly apply the Plan-Do-Check-Act model of continuous quality improvement.
16 *Arnetz et al.* investigated in a large RCT the effect of the Plan-Do-Check-Act model, through a data
17 driven worksite based intervention in 41 units across seven hospitals in US over a period of 5 years.
18 (14) The study provided moderate evidence of this approach in decreasing risks of patient-to-worker
19 violence and related injury at six months post intervention: the incident rate ratio (IRR) of violent
20 events was significantly lower on intervention units compared to control: IRR 0.48, CI (0.29-0.80).
21 However, this effect was not confirmed over time during the 24-month follow up period. At that
22 time, only the violence related injury was lower on intervention units compared to control (IRR 0.37,
23 CI (0, 17-0.83)). *Lipscomb et al.* evaluated in a 4-year study the impact of the implementation of the
24 OSHA guidelines and compared three intervention groups with 3 comparison groups in mental health
25 facilities. (15) Both the intervention and the comparison group implemented safety preventions but
26 the comparison group did not benefit from the support of the additional project team on violence
27 prevention. The staff in both intervention and comparison group reported significant improvements
28 in the OSHA elements: management commitment, employee involvement, and hazard assessment
29 and hazard control activities. Intervention facilities reported also significant improvement in the
30 training element. There was no significant reduction in physical assaults in the intervention group nor
31 in the comparison group. There was a significant increase in threats in the intervention group (+98%,
32 $p < 0.001$). The authors suggested a greater tendency to report less severe events in the intervention
33 group as a possible interpretation for this unexpected finding.
34

35 *Mohr et al.* investigated in a longitudinal study the impact of the implementation of a Workplace
36 Violence Prevention Programme (WVPP) and its different dimensions in 138 Veteran Health Care
37 Facilities. (16) Overall, there was no significant change in assault rates over time. The training
38 dimension showed a significant but moderate 5% reduction in standardised incidence rate. The
39 authors argue that the large variation across the facilities and the underreporting prior to WVP
40 programme might provide an explanation for the results. *Magnavita et al.* studied the effect of an
41 aggression minimization programme in a small-scale psychiatric unit in Italy. The interventions
42 included changes in architecture and work organization and training of employees. A stable and
43 significant reduction in assault rate per employee from 0.24 to 0.04 per year was reported. (17)
44

45 *Risk assessment and risk control measures* (Table 5)

46 Violence risk assessment and violence management are intrinsically connected. The risk factors can
47 be categorised based upon their source of origin: workplace design, work organisation, patient
48 factors, physician factors and social context. Numerous studies confirmed the following items as
49 main risk factors for aggression: long waiting times, discrepancy between patients' expectations and
50 the services offered, alcohol or drug abuse by the patient and a psychiatric condition.
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3 Subsequent to the specific violence risk assessment, taking appropriate risk control measures is the
4 next step. Changes to the physical environment and work policies are based on situational crime
5 prevention and aim to increase the effort of criminal activity, increase the risk of getting caught,
6 reduce the rewards of criminal activity, reduce provocations and remove excuses for disruptive and
7 violent behaviour.(18)

8
9 The proposed changes to the physical environment vary across the different health care settings and
10 may include effective indoor and outdoor lighting, sufficient exit routes, and physical barriers for
11 receptionists, automatic door locks, video cameras, panic buttons, portable alarms, comfortable
12 waiting areas to reduce stress. No concrete evidence exists on the effectiveness of these
13 interventions.(19) (6)(20)(21)(22) In some emergency departments in the US, metal detectors have
14 been installed, although they may theoretically mitigate violence, there is no concrete evidence to
15 support this expectation.(6)

16
17 Adequate work policies include “zero tolerance” policies, incident reporting, training of staff,
18 adequate staffing, policies on drug prescription and storage, a roadmap to follow when faced with
19 aggressive behaviour and additional measures for out-of-hours services. Drugs, cash and
20 prescriptions should be stored in locked places and limited amounts. Long waiting times should be
21 managed by improving staffing levels during busy periods and by setting up courtesy message
22 systems to alert patients about delay.(21)(23) Some guidelines and studies propose a “zero
23 tolerance policy” with explicit statement and warning signs stating that violence will not be
24 tolerated. It is important to recognise verbal assault as a form of workplace violence since it is a risk
25 factor for physical violence. (21) Some authors advise to restrict or withdraw access to general
26 practise or emergency department services for patients with a history of violence.(18) However, this
27 also might compromise the equality of access to care principle and there is no evidence on the
28 impact on violence reduction. General practitioners should take additional measures for out-of hours
29 house call services such as using a central dispatch centre or a shared visit schedule and tracking
30 system. Additional support might be provided in certain circumstances or upon request of the GP.
31 *Ifediora et al* investigated the implementation of safety measures by GPs on after-hours call services
32 in Australia: overall 43% of doctors adopted protection measures while on after-hour house calls, for
33 example, 34% used additional chaperones or security personnel. The study did not investigate the
34 impact of these measures on violence incidents.(24) *Morken et al.* investigated in a cross sectional
35 study the implementation of 22 safety recommendations in 210 Emergency Primary Care Centres in
36 Norway. The study provides an indication on the perceived usefulness and feasibility of the
37 recommendations.(25)

38
39 Training of staff in communication skills, violence and de-escalation techniques should be included in
40 a comprehensive violence prevention programme. Effective training on de-escalation should focus
41 on cognitive, affective and skills based improvements. Self-awareness and the ability to connect
42 interpersonally are crucial. *Price et al* investigated in a systematic review, the cognitive and affective
43 outcome and the effectiveness of training on violence. There is currently limited evidence that this
44 training has an effect on de-escalation of aggressive behaviour.(26) As discussed hereafter, de-
45 escalation is a highly skilled intervention and this may explain the limited effectiveness of time-
46 constraint training programmes.(27)

47
48 With respect to patient risk factors, the risk of violence is dynamic and contextual.(28) Violence in
49 medical health care is mostly impulsive and accompanied by the fight flight response although also
50 premeditated aggression occurs. Patient aggression risk assessment tools have shown to be effective
51 as a predictor for short-term violence. *Abderhalden et al.* investigated in a RCT the use of short-term
52 risk assessment in 14 acute psychiatric wards in Switzerland. The intervention consisted of a
53 structured risk assessment twice daily combined with a communication of risk scores and a
54 recommendation for actions tailored to the risk level. The study showed a significant reduction in
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3 severe events of patient aggression, a significant reduction in attacks and a significant reduced need
4 for coercive measures.(29) Flagging patients with a history of violent events resulted in a 90%
5 reduction in assault by high risk patients in Veteran Health Care hospitals in US.(30)
6
7

8 *Interventions during event*

9 During the event of violence the following recommendations are described in guidelines: stay calm
10 and apply de-escalation techniques, if de-escalation fails, take care of your own safety, go away or
11 use self-defence techniques and activate the emergency procedure (references in table 4).
12

13 The use of restrictive interventions should only be applied in accordance with pre-established
14 protocols and in a manner that complies with the Human Rights.

15 De-escalation is not only in the medical care sector but also in other settings a highly recommended
16 component of violence prevention. Garriga et al. (table 3) carried out a systematic review on
17 assessment and management of agitation in psychiatry. (31) After identification of possible medical
18 causes for agitation, verbal de-escalation and environmental modification are the first choice of
19 intervention.
20

21 As established by *Richmond et al.*, de-escalation can be successful in less than 5 minutes. Non-
22 coercive de-escalation is practised in a 3- step approach: firstly the patient is verbally engaged,
23 secondly a collaborative relationship is established and thirdly the patient is verbally de-escalated
24 out of the agitated state table 2.(32) De-escalation frequently takes the form of a verbal loop in
25 which the clinician listens to the patient, finds a way to respond that agrees with or validates the
26 patient's position and then states what he wants the patient to do. The clinician may have to repeat
27 the loop a dozen or more times and inexperienced clinicians tend to give up.(27)

28 Similar principles of de-escalation have also been described by *Kohlrieser*, a psychologist and hostage
29 negotiator.(33)
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33 *Post-incident measures*

34 As studied by *Geoffrion et al.* individual and organisational factors can lead to trivialization of
35 workplace violence, a culture of silence and underreporting of workplace violence. Two aspects play
36 a role in trivialization of workplace violence: normalisation of violence as being "part of the job" and
37 taboo: avoiding an open discussion out of fear of being stigmatised as incompetent and thus
38 refraining from complaining about it. Colleague and employer support, training on violence, zero
39 tolerance policy all contribute to normalisation of violence but decrease the likelihood of taboo.
40 Organisations should be aware of this paradox and may be implicitly sending the message that
41 violence is to be expected.(34)
42

43 Reflecting on incidents or performing a root cause analysis in team specific workshops can identify
44 systematic weaknesses and potential solutions, action plans and revision of the WPV policy.(35)

45 Victims should be provided with assistance and support while addressing short and long-term
46 consequences. *Schat et al.* investigated the effect of organisational support in reducing the negative
47 consequences of workplace violence and found a small positive effect on emotional wellbeing,
48 somatic health and job related affect but there was no effect on fear of future violence and job
49 neglect.(36)
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Discussion

Summary of main results

This review demonstrated that few studies have been successful in providing evidence on efficacy of interventions to prevent aggression against doctors and more specifically against the general practitioner. Only one RCT provided moderate evidence that a Violence Prevention Programme was effective in decreasing risks of patient-to-worker violence and related injury.(14) By contrast, longitudinal studies showed conflicting results in assault rates after implementation of a Workplace Violence Prevention Programme.(16)(37)(30) Appropriate workplace design and work policies aim to reduce risk factors for violence such as long waiting times and crowded waiting areas but there is lack of hard evidence on the proposed interventions.(6)(20)(21)(22) During the event of violence or agitation, applying de-escalation techniques is a highly recommended component of violence prevention and physical restraint should be considered as a last resort strategy.(31) Post-incident interventions such as incident reporting followed by root cause analysis of the incident provides the basic input for review and optimisation of the Violence Prevention Programme.

This review included quantitative and qualitative studies, focussing not only on violence incidence rates but also on why and how an intervention works. Although there is lack of hard evidence on the effectiveness of Occupational Health and Safety Management Systems, there is wide consensus that the implementation of a comprehensive health and safety prevention plan is the key to understanding, preventing and dealing with Workplace Violence.(38) As stated by *James* in his book *Violence assessment and intervention*: 'Preparation is critical as long as you accept that whatever you plan for and however you plan for it to occur, will never happen. Preparation is the "primer" to get you propelled toward resolve and is important in addressing a crisis.'(39)

A work site-specific violence risk assessment provides the basic input for interventions. The focus of prevention and intervention goes to both the clinician and logistics or infrastructure. Major risk factors for violence are long waiting times, discrepancy between patients' expectations and the services offered, alcohol or drug abuse by the patient or a psychiatric condition. Specific risk control measures on the level of work policies to ensure adequate staffing and reduce waiting times and training personnel in de-escalation seem rational interventions even without hard evidence. The dynamic nature of risk feeds the issue of unintended consequences or the "intervention dilemma". This dilemma states that any intervention has the capacity to either reduce risk or not affect risk or even intensify risk.(28) On the level of workplace design and work policies, a 100% security will never be obtained. A balance has to be made between safety and quality of life and quality of care.(39) Some interventions proposed to increase safety may be in conflict with the goals of health care. For example, a zero tolerance policy or flagging patients with violent history can lead to stigmatisation of the patient and can be in conflict with patient confidentiality and the right to medical care. Implementation of overt measures such as security guards or barricades between staff and patients might impair the doctor-patient relationship, which can lead to a spiral of fearfulness and suspicion and ultimately a greater risk of violence. Evidence suggests that individuals with an increased risk for violent acts are not violent at all times nor in all situations.(20)

De-escalation, if undertaken with genuine commitment and with the collaborative goal of "helping the patient calm himself" has successful outcome in far more cases than previously thought possible and it can be successful in less than 5 minutes. (31)(32). De-escalation is a highly skilled intervention and this may explain the limited effectiveness of time-constraint training programmes.(27)

Underreporting is a well-known issue in Workplace Violence Management. It is partly due to normalisation of violence as being part of the job and perceived taboo associated with complaining about violence. Underreporting is influenced by interventions itself and complicates research and interpretation of results.

Victims of type II Workplace Violence should be provided with assistance and support while addressing short and long term consequences.(36) A decline in frequency of assaults occurs after

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3 implementation of a peer help programme for assaulted staff and unavailability of debriefing is
4 associated with increased reports of post-traumatic stress.(40)
5

6 *Limitations*

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8 The first limitation lies in the risk of bias across studies since mainly English and some French,
9 German and Dutch publications were screened. Second, research on Work Place Violence is also
10 published outside the traditional international medical scientific literature databases.

11 The second limitation lies in the risk of bias within studies. Only three randomised controlled trials
12 are included in this review.(14) (29) (41) Performance bias, detection bias and reporting bias are
13 present in all studies. Due to the nature of the problem and the interventions, allocation
14 concealment, blinding of participants and blinding of outcome assessment is not possible. Also as
15 discussed in this review, underreporting and selective reporting is a well-known issue in Workplace
16 Violence, is variably present in all studies and is influenced by the intervention itself.(14) Recall bias
17 is also present due to data collection in the form of questionnaires inquiring about violent events
18 over the past 12 months.(41) Finally, performance bias is present in all studies through various
19 mechanisms: a medical care setting is a complex structure and organisational changes might have an
20 impact on care quality and on safety performance and might interfere as a co-intervention.
21 Moreover, in all randomised controlled trials, the control group will always have its own safety
22 prevention policy.
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26 The starting time of the literature search was set on the year 2000. The very comprehensive review
27 of Runyan et al, published in this year was included in the analysis of this review.
28

29 *Suggestions for further research*

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31 We believe that a large and long-term cohort study could provide more insight and evidence on
32 effective interventions to prevent aggression against the general practitioner. Risk factors for type II
33 workplace violence are well-known, however there are insufficient data on protective factors for
34 aggression against doctors. Analysis of large amounts of data on the cohort should have enough
35 statistical power to provide insight in the protective factors and effectiveness of interventions
36 against type II workplace violence.
37

38 With respect to preventive measures, a yearly update on the applied safety measures and other
39 characteristics per general practise is to be determined. Basic information on recommended safety
40 prevention measures and training on de-escalation techniques should be available to the cohort.

41 With respect to post-event interventions, the general practitioners in the study cohort could
42 implement a shared violence incident-reporting tool.
43
44

45 **Conclusion**

46 Aggression against physicians is a well-known and serious occupational hazard. There is moderate
47 evidence that an integrated Violence Prevention Programme can decrease the risks of patient-to-
48 worker violence. Appropriate workplace design and work policies aiming to reduce risk factors and
49 applying de-escalation techniques during an event of aggression are highly recommended. Taking
50 into account that detection, reporting and performance bias will inherently be present in any RCT on
51 interventions against Type II workplace violence, we believe that a large cohort study could provide
52 more evidence on effective interventions to prevent aggression against the general practitioner.
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3 *Competing interests*

4 There were no competing interests
5

6
7 *Funding*

8 There was no external or internal funding involved in this research.
9

10 *Authors' contributions*

11
12 Ann Raveel: setting up the design en method, data acquisition and analysis, interpretation of data,
13 drafting the paper, approving final version, accountable for the entire work

14 Birgitte Schoenmakers: delivering the research question , supporting, reviewing and revising the
15 research process, performing data quality check, revising the manuscript for publication, accountable
16 for both the work and the researcher
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Tables

GP: General Practise, ED: Emergency Department, WPV: Workplace Violence, Psy: Psychiatric setting, Gen: General Health Care, EPC: Emergency Primary Care; ICU: Intensive Care Unit, GER: Geriatrics

Level according to Oxford 2011 levels of evidence.

Outcome quality rating in accordance with GRADE methodology.

Table 1 Summary of selected quantitative studies

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Arnetz et al., 2017 (14)	US, 7 hospitals, 41 units, 2800 employees,	Level 2 Moderate	RCT intervention 5 years, 4 phases Data driven, worksite based intervention plan-do-check-act Hazard Risk Matrix to identify high risk units in intervention and control groups	<ul style="list-style-type: none"> Plan-Do-Check-Act model data driven and worksite based intervention stakeholder involvement 	<ul style="list-style-type: none"> rates of violent events rates of violent related injuries intervention compared to control group evolution over time compared to baseline 	<p>Rates of violent events:</p> <ul style="list-style-type: none"> Six months post intervention, incident rate ratio of violent events (IRR) was significantly lower on intervention units compared to control IRR 0.48 CI (0.29-0.80) Rates of violence decreased slightly but not significantly in the intervention group compared to baseline and increased significantly in the control group compared to baseline. Significantly increased violent event rates at 24 months compared to baseline in both groups: Intervention group from 8 to 13.8 per 100FTE and control group from 8 to 15.4 per 100 FTE. <p>Violence related injuries:</p> <ul style="list-style-type: none"> 24 months post intervention, the violence related injury was lower on intervention units compared to control IRR 0.37 CI (0,17-0.83)

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						Remark: results were not consistent over time during 24 month follow up period.
Abderhalden, 2008 (29)	14 Acute psychiatric wards, 2364 patients Switzerland PSY	Level 2 Moderate	RCT: 14 acute psychiatric wards, 2364 patients phase 1: 3 months baseline data phase 2: 3 months intervention period	<ul style="list-style-type: none"> structured short term risk assessment : Swiss version of Brøset Violence Checklist, 2 times per day during first 3 days in case of high risk (1 in 10 patients will physically attack during next shift): discuss possible prevention measures from list in case of very high risk (1 in 4 patients): multidisciplinary team discussion on preventive measures and plan and implement preventive measures. 	<ul style="list-style-type: none"> risk assessment incident rates staff observation aggression scale attacks coercive measures 	<ul style="list-style-type: none"> Significant reduction in severe events of patient aggression: adjusted risk reduction 41% intervention versus control 15%, p < 0.001 Significant reduction in attacks: 41% versus 7%, p < 0.001 Significant reduced need for coercive measures : 27% reduction in intervention group versus 10% increase in control, p < 0.001 Structured risk assessment twice daily in acutely admitted psychiatric patients combined with a communication of risk scores and a recommendation for action tailored to risk level reduced the incidence rate of coercive measures and severe aggressive incidents.
Arnetz, 2000 (42)	47 health care work places 1500 nurses in Emergency departments, geriatric, psychiatric, home healthcare	Level 3 Low	RCT Implementation and evaluation of a practical intervention programme for dealing with violence towards health care workers.	<ul style="list-style-type: none"> violence incidence form in intervention and control group structured feedback programme in intervention group 	<ul style="list-style-type: none"> awareness of risks of violence ability to deal with aggressive situations exposure to violent incidents 	<ul style="list-style-type: none"> better awareness of risk situations and of how to deal with aggressive patients (Low) 50% increase in incident reporting in intervention group compared to control group (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2006 (15)	Sweden ED, Psy, GER New York State 26 units: 6 units selected Psy	Level 3 Low	<ul style="list-style-type: none"> evaluation of the impact of OSHA guidelines on workers health and safety 3 intervention groups, 3 comparison groups base line and post intervention survey 4 years study 	<ul style="list-style-type: none"> OSHA guidelines serves as framework 1. Management commitment to Violence Prevention Programme 2. Employee involvement in VPP 3. Hazard assessment activities 4. Hazard control activities: infrastructural, organizational, environmental, administrative, behavioural 5. Training 	<ul style="list-style-type: none"> staff perception of quality of programme elements frequency of reported threat and physical assaults in intervention and comparison facility pre- and post-intervention 	<ul style="list-style-type: none"> Staff in both intervention and comparison group reported significant improvements in first 4 elements of the OSHA elements (Low). Intervention facilities reported significant improvement in the training element. (Low) No significant reduction in the change in physical assaults in intervention group nor in comparison group Significant increase in threats of assault in intervention group (+98%, p <0.001), a non significant increase in comparison group (+47%, p= 0.08) remark: Both the intervention and the comparison group did implement safety preventions but the comparison groups did not benefit from the support of the team resources of the worksite violence study.
Magnavita, 2011	small scale psychiatric unit Italy about 85 workers	Level 3 Low	<ul style="list-style-type: none"> pre- and post intervention comparison test 	aggression minimization programme as part of total quality management 1) architecture and work organization: <ul style="list-style-type: none"> rearrangement of building, 3 assistance 	<ul style="list-style-type: none"> Violence Incident Form assault rate: pre and post-intervention 	<ul style="list-style-type: none"> Mean assault rate per employee was significantly reduced from 0.24 per year to 0.04 per year after the intervention Stable decline over time in assaults after the intervention

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
				areas depending upon severity of mental illness • increased nurse-to-patient ratios, staff coverage • remove patients from monitoring tasks • improved lighting • safety alarms 2) Education	• assault rate for aggression using physical force • verbal abuse etc, not addressed	
Kling, 2011(43)	acute care hospital Canada 109 cases	Level 3, Low	pre- and post – intervention study evaluation of violent risk assessment system and retrospective case control	Violence risk assessment flagging in patient file and on wrist band and violence prevention training taking precautions such as : wearing personal alarm, security team nearby, not entering patient room alone, not having sharp objects	• violent incident risk • adjusted OR for violence in flagged patients	During intervention compared to pré-intervention • RR hospital: 0.57 (0.33-1.83) (not significant) • RR direct patient care workers: 0.52 during intervention (0.33-0.81) • RR high risk department: 0.39 (0.24-0.61) Post intervention compared to pre-intervention • RR hospital 1.01 (0.989-1.04) • RR direct patient care workers 1.03 (1.00-1.06) • RR high risk department: 1.04 (1.01-1.07) In contrast to hypothesis: • adjusted OR for violent incident 6.28 for patients flagged by the Alert System

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Mohr, 2011(16)	138 Veterans Health Care Facilities	Level 3 Low	<ul style="list-style-type: none"> Longitudinal study Impact of implementation of a workplace prevention programme on rates of workplace violence over a period of 6 years: 2004-2009 Relationship of assault rates with WPV dimension score percentage change in assault rates in 2009 compared to 2004 	<ul style="list-style-type: none"> Implementation of a Workplace Violence Prevention Programme WVP dimension score 	<ul style="list-style-type: none"> 43 WVP items, grouped into 3 dimensions : training, workplace practises, environmental control and security standardized assault rate 	<ul style="list-style-type: none"> Overall there was an increase in assault rates over time: from 59 to 71 per 10.000 FTE 34% of facilities had reduced assault rates, average improvement 42% Facilities with no reduction had an average increase of 125% in assault rate Training dimension: significant but moderate 5% reduction on standardised incidence rate (Low) No significant change in assault rates over time possible explanation: <ul style="list-style-type: none"> Large differences in facilities in assault rate reduction or increase Underreporting prior to WVP programme Reduction in severity of assaults (workers compensation claims declined 40% between 2001 and 2008)
Hvidhjelm, 2014 (44)	forensic psychiatry, 156 patients Denmark Psy	Level 3 Low	<ul style="list-style-type: none"> population based observational study sensitivity and specificity of the Brøset Violence Checklist 156 patients, checked 3 times per 	<ul style="list-style-type: none"> BVC 6 items checklist as predictor of short-term (<24u) risk of violence score 6 items: presence or absence of: confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> risk of violence within 24 hours 	BVC showed overall satisfactory specificity and sensitivity as a predictor of short term risk of violence, (Low) score ≥ 3 : <ul style="list-style-type: none"> sensitivity : 65.6%, specificity 99.7% with overall risk 0.3%: PPV score ≥ 1: 17.5%

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			day during 24 months			<ul style="list-style-type: none"> • PPV score ≥ 3: 37% • NPV score < 3: 99.9%
Partridge, 2017 (45)	Emergency Department, 2046 patients Australia ED	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • statistical utility of the Brøset Violence Checklist by a security officer in emergency department 	<ul style="list-style-type: none"> • predicting aggressive patient behaviour using the Brøset Violence Checklist by security officers in ED 	<ul style="list-style-type: none"> • short term risk of violence 	BVC showed a good sensitivity, specificity and predictive value of short term risk of violence, (Low): overall risk 1.7% <ul style="list-style-type: none"> • score ≥ 1: PPV 16.7% , LR+ 11.6 sensitivity 88.6%, specificity 92.4% • score ≥ 2 : PPV 34.2%, LR+ 30.3 sens. 65.7%, spec. 97.8% • score ≥ 3: PPV 55.2 % ,LR+ 71.4 sens. 45.7%, spec. 99.4%
Morken, 2013 (46)	210 Emergency Primary Care Centres Norway GP	Level 5 Very Low	Cross sectional study, survey on application of 22 safety measures items in 210 Emergency Primary Care Centres	<ul style="list-style-type: none"> • Available staff: extra person during home visit when needed (44%), more than one person on duty (30%) • Reception design with glass barrier (86%), view to entrance (62%) and waiting rooms (72%) • Consulting room setup: alternative exit (59%), quick entrance/exit for staff (46%), patient not sitting between clinician and door (29%) • Electronic Safety systems: alarm on medical radio network (74%), automatic door lock (54%), portable alarm (28%), CCTV camera (28%), ... • Training (40%) • Reporting: Monitor and follow up of Violence episodes (75%) • No reporting of number of violent incidents • 98% response rate • No results on effectivity • Application of measures give indication on perceived usefulness of recommendations and feasibility of recommendations 		
Nau, 2009 (47)	63 nursing students attending	Level 5 Very Low	Longitudinal pre- and post test study	<ul style="list-style-type: none"> • 3 days training course 	<ul style="list-style-type: none"> • Confidence in coping with 	<ul style="list-style-type: none"> • Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (Very Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	training course, Germany		The development and testing of a training course in aggression for nursing students		patient aggression • 10 item scale • no results on actual performance in health care settings	• Training should be seen as a valuable initial step in developing aggression related requirements
Schat, 2003 (36)	Health care setting 225 employees in health care	Level 5 Very Low	organizational support: reducing adverse consequences of workplace aggression Survey, moderated multiple regression	secondary prevention: moderating effect of organizational support: instrumental support (e.g. support from co-workers) and informational support (e.g. training) on negative consequences of workplace aggression and violence	• fear of future violence • emotional well-being • somatic health scale • job related affect • job neglect	• instrumental support: positive effect on variance of (3%-6%) : emotional well-being, somatic health, job related affect. No effect on fear of future violence and job neglect. (Very Low) • information support: positive effect on variance of (3%-6%) emotional well-being, no effect on other outcomes. (Very Low) • no effect on: fear of future violence and job neglect
Chris Ifediora, 2015 (24)	General Practise Australia 300 doctors of National Home Doctors Service after hours house call services GP	not applicable	Survey: exploring the safety measures by doctors on after-hours house call services	• No study of impact on violence incidents • 57% response rate • Safety measures by doctors on after-hours call services: ○ overall 43% of doctors adopted protection measures while on after-hour house calls ○ use of chaperones/security personnel: 34% ○ dependence on surgery policies such as vetting and blacklisting risky patients, documenting doctor's destinations: 31% ○ de-escalation or self-defence techniques: 19% ○ panic buttons:7% ○ personal alarms:6%		
Hills, 2013 (48)	Australia, clinical medical practise,	not applicable	Cross-sectional study, self report survey of	No report on effectivity of measure Implementation of recommendations: 1. policies, protocols for aggression prevention and management: 66%		

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	9449 doctors of which 3515 GPs		implementation of prevention and minimisation actions MABEL survey	<ol style="list-style-type: none"> 2. warning signs in reception: 49% 3. alerts to high risks of aggression: 52% 4. restricting or withdrawing access to services for aggressive persons: 45% 5. incident reporting and follow up: 68% 6. Education & training: 53% 7. Alarms : 47% 8. Clinician escape: 23% 9. optimized lighting, noise level, comfort and waiting time in waiting area: 52% 10. patient access restriction: 62% 11. Building security system: alarm, camera, ...: 70% 12. safety measures for after-hours on-call work or home visits: 34% 		
Geoffrion, 2015 (34)	1141 healthcare workers and law enforcers, Canada GEN	not applicable	Survey : Individual and organizational predictors of trivialization of workplace violence among healthcare workers and law enforcers.		<ul style="list-style-type: none"> • normalisation of violence as being “part of the job” • taboo: avoiding open discussion, fear of being stigmatised as incompetent 	<ul style="list-style-type: none"> • discussion on underreporting Individual factors in healthcare: • men are more likely than women to consider WPV as part of the job (34% versus 23%) and perceived a taboo (54% vs 42%) • Staff with more than 15 years of work experience are more likely to tolerate WPV as part of the job • Organizational factors: colleague and employer support, training, zero tolerance policy contribute to normalisation of violence but decrease the likelihood of taboo

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Table 2: Summary of selected qualitative studies

GRADE-CERQual assessment

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie, 2013 (49)	3 Emergency Departments US 80 employees ED	Medium	Implementation and Evaluation of a sustainable comprehensive department-based ED violence prevention programme. Action research principle: academic researchers partner with clinicians and collaboration with stakeholders	<ul style="list-style-type: none"> WPV policies and procedures: e.g. risk assessment, recordkeeping, response to violent events. WPV education Environmental changes: e.g. panic buttons, lock doors, cameras 	<ul style="list-style-type: none"> Impact on violence rates was not reported Programme fidelity: Variable success in institutionalizing and sustaining intervention subcomponents. Mixed overall evaluation of programme by employees <ul style="list-style-type: none"> Employees rated the programme as moderately beneficial. Surveillance and monitoring environmental changes, education and post incident care were rated as very important Policies and procedures were rated as important Managers and educators programme evaluation: <ul style="list-style-type: none"> Most important components were : surveillance, environmental changes, class room training and post incident-care. WPV assessment screening at triage for all patients was evaluated as least effective There was a low participation level of physicians. Underreporting of violent events
Henson, 2010 (18)	Emergency Departments Situational Crime Prevention in Emergency Departments ED	Medium	Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory	<ul style="list-style-type: none"> Increase the Effort of criminal activity: e.g. secure entrances/exits, metal detectors Increase the Risks of getting caught: e.g. install CCTV cameras Reduce the Rewards of criminal activity: e.g. reduce the amount of prescription drugs carried by staff 	<p>In many EDs these interventions are partially implemented based upon risk assessment and prevention rationale.</p> <p>A systematic test of the proposed prevention techniques is not performed.</p> <p>Remark:</p> <p>1) Situational crime theory is based on rational choice however, violence in healthcare is mostly impulsive and unplanned.</p> <p>2) To deny access to ED if patient is drunk or intoxicated is in conflict with the patients</p>

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				<ul style="list-style-type: none"> • Reduce Provocations: e.g. appropriate waiting areas, secure and isolate volatile patients • Remove excuses for disruptive and violent behaviour: e.g. clearly post rules of conduct and consequences for breaking them, streamline check –in process form, refuse admission to intoxicated visitors 	fundamental right to healthcare and the physicians duty of care.
Holloman, 2012 (50)	Emergency Psychiatry Psy	Medium	Overview of Project BETA: Best Practises in Evaluation and Treatment of Agitation: to develop guideline including all interventional aspects : triage, diagnosis, verbal de-escalation and medicine choices.	5 study workgroups <ol style="list-style-type: none"> 1. medical evaluation and triage of the agitated patient 2. psychiatric evaluation of the agitated patient 3. Verbal de-escalation of the agitated patient 4. Psychopharmacologic approaches to agitation 5. Use and avoidance of seclusion and restraint 	
Stowell, 2012(51)	Emergency Psychiatry	Medium	BETA project Psychiatric Evaluation of the Agitated Patient.	Prior to attempting de-escalation, a brief evaluation must be aimed at determining the most likely cause of agitation: <ol style="list-style-type: none"> 1. Has the patient an acute medical problem ? 2. Has the patient a delirium ? 3. Has the patient a chronic cognitive impairment that is contributing to the current state of agitation ? 4. Is the patient intoxicated or in withdrawal? 5. Is the patients agitation due to psychosis caused by a known psychiatric disorder? 6. Is the agitation due to nonpsychotic depression or anxiety disorder? 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7. Is the patient simply angry or out of control ? 8. Assess the risk of suicide and violence	
Richmond, 2012 (32)	Emergency Psychiatry	Medium	BETA project Verbal de-escalation of the agitated Patient .	The authors detail the proper foundations for appropriate training for de-escalation using the 10 domains of de-escalation:" 1. Respect the patient and your personal space: maintain at least 2 arm's length of distance 2. Do not be provocative: avoid iatrogenic escalation. Body language and tone of voice should be congruent with what the clinician is saying. 3. Establish verbal contact: Only 1 person verbally interacts with the patient. Introduce yourself to the patient and provide orientation and reassurance, explain that you are there to keep him safe and make sure no harm comes to him or anyone else. 4. Be concise and keep it simple, use short sentences, give the patient time to process and respond. 5. Repetition is essential to successful de-escalation, repeat your message until it is heard, set limits and offer choices, listen actively to the patient and agree with his position whenever possible. 6. Identify wants and feelings: Use free information to identify wants and feelings. Listen closely to what the patient is saying use active listening and Miller's law: you must assume that what the other person is saying is true and try to imagine what it could be true of, this makes you less judgmental and the patient will sense that you are interested in what he is saying and this will improve your relationship 7. Agree with the patient as much as possible or agree to disagree 8. Lay down the law and set clear limits: Establish basic working conditions: communicate these in a matter-of-fact way and not as a threat. This requires that both patient and clinician treat each other with respect. Limit setting must be reasonable and done in a respectful manner. Coach the patient in how to stay in control 9. Offer choices and optimism. Be assertive and propose alternatives to violence. Offer realistic things that will be perceived as acts of kindness such as blankets, drinks... Broach the subject of medication when needed and offer choices to the patient. The goal is not to sedate but to calm down. 10. Debrief the patient and staff"(32)	
Wilson, 2012 (52)	Emergency Psychiatry	Medium	Psychopharmacology of agitation	"	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			BETA project	<ol style="list-style-type: none"> 1. Pharmacologic treatment of agitation should be based on an assessment of the most likely cause for the agitation. If the agitation is from a medical condition or delirium, clinicians should first attempt to treat this underlying cause instead of simply medicating with antipsychotics or benzodiazepines. 2. Oral medications should be offered over intramuscular injections if the patient is cooperative and no medical contraindications to their use exist. 3. Antipsychotics are indicated as first-line management of acute agitation with psychosis of psychiatric origin. 4. When an antipsychotic is indicated for treatment of agitation, certain SGAs (such as olanzapine, risperidone, or ziprasodone), with good evidence to support their efficacy and lack of adverse events, are preferred over haloperidol or other FGAs. Agitation secondary to intoxication with a CNS depressant, such as alcohol, may be an exception in which haloperidol is preferred owing to few data on second-generation antipsychotics in this specific clinical scenario. 5. If haloperidol is used, clinicians should consider administering it with a benzodiazepine to reduce extrapyramidal side effects unless contraindications to use of this medication exist. “(52) 	
Price, 2012 (27)	Process of de-escalating violence and aggression excluding patients with dementia	High	Key components of de-escalation techniques Qualitative research Thematic synthesis	<p>“7 themes</p> <p>Staff skills:</p> <ol style="list-style-type: none"> 1. characteristics of effective de-escalators: open, honest, supportive, self-aware, coherent, non-judgmental and confident without being arrogant 2. maintaining personal control: calmness conveys that the member of the staff is in control of the situation whereas fear can increase anxiety, make the patient feel either unsafe either that they have gained the upper hand. 3. verbal and non verbal skills: calm, gentle, soft tone of voice <p>Process of intervening:</p> <ol style="list-style-type: none"> 4. engaging with the patient: establish a bond 5. when to intervene 6. ensuring safe conditions for de-escalations 7. Strategies for de-escalation <ul style="list-style-type: none"> ○ autonomy confirming interventions <ul style="list-style-type: none"> ○ shared problem solving ○ facilitating expression ○ offering alternatives to aggression 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
					limit setting and authoritative interventions: knowing when to exert control and implement" (27)
Morken, 2015 (53)	Emergency Primary Health Care, Norway 15 nurses and 22 physicians	Medium	Focus group study, qualitative design Dealing with workplace Violence in emergency primary care focusing on organizational factors.	organizational strategies for workplace violence prevention: 1. Minimizing the risk of working alone: a. Having an efficient alarm system with adequate response time to summon someone. b. Regular turning up of colleague. 2. Being prepared: obtain information prior to the consultation, take precautions when facing warning signs, alerting colleagues or police in advance. 3. Resolving mismatch between patient expectations and services offered: e.g. clear and consistent procedures on not handing out drugs to patient and communicate these to the public. 4. Supportive manager response in follow up of a violent episode.	
Moylan, 2017(54)	General practise, Australia	not applicable	Discussion on practical measures to manage the risk of occupational violence based on guidelines from RACGP and WorkSafe Victoria. (55), (56)	multilevel response: 1. workplace design 2. policies and work practises 3. training Before consultation: 4. Is there a quick exit route ? 5. Do you have an alarm mechanism or call for assistance ? 6. Are there patient flags for previous violence ? 7. Are there other client risk factors present ? 8. Is a chaperone required ? During consultation: 9. Are warning signs of violence present ? 10. De escalate versus end consultation ? After the consultation: 11. Has the patient left safely ? 12. Are others in practise safe? 13. Documentation of event ?	
Elston, 2016 (57)	General practise 1300 GPs 13 focus groups 19 in-depth interviews	Medium	Survey, in depth interviews, focus group discussions	<ul style="list-style-type: none"> No gender difference in overall risk of violence. Increased risk for physical assaults within younger, male GPs . Women were more likely to express concerns about violence . Women consistently adopted more preventive measures than men. Male and female GPs downplayed the impact of any violence. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
	English National Health Service UK		Gender differences in risk of violence and prevention measures.	<ul style="list-style-type: none"> Male and female GPs spoke of fear and being vulnerable. Fear and the impact of violence: differences in terms and tone between men and women GPs, higher emotional intensity in terms used by women GPs. Sexual assault and harassment: Male and female GPs are confronted with this. Women GPs explicitly suggested their professional standing protected them. Reducing risk and minimising harm: <ul style="list-style-type: none"> GPs strongly opposed to so-called “fob press medicine”. GPs emphasising importance of professionalism and good communication skills to reduce risk and harm. Leaving visit schedule with someone. Check patient notes in advance. Policy adapted such that GPs use at their discretion the opportunity to be accompanied during home visits. 	
Sim, 2011 (23)	General practise, Australia	not applicable	Aggressive behaviour: Prevention and management in the general practise environment	<ul style="list-style-type: none"> Strategies to prevent aggression: <ul style="list-style-type: none"> Staff: friendly, patient focused approach, demonstrating willingness can reduce stimuli for aggressive behaviour System approach to reduce long waiting times: e.g. include emergency appointment slots, courtesy message systems to alert patients about delays, rescheduling late patients.... Management of aggression: <ul style="list-style-type: none"> Recognizing aggressive behaviour. De-escalating early aggression. Limit setting and follow up of incidents. Use of verbal or written behaviour contracts. System approach by applying the plan-do-check act approach. Establish a roadmap to follow when faced with aggressive behaviour. 	
Magin, 2010 (58)	General practise, Australia practise receptionists	medium	Semi-structured interviews Experiences and perceptions of GP receptionists with Perspex and lockdown system.	<ul style="list-style-type: none"> Perspex and lockdown system implemented or not implemented 	<p>Experiences and perceptions of GP receptionists:</p> <ul style="list-style-type: none"> positive perception about the safety measures for reducing risks concern to compromise the feeling of a practise being patient centred by alienating patients from staff and paradoxically increasing the levels of patient violence and staff fearfulness responders from low prevalence practises did not see the need for these measures

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Magin, 2008 (19)	General practise, Australia GP	Medium	Focus group discussions (18GPs) and questionnaire (154 GPs) Underlying and proximate causes of violence	<ul style="list-style-type: none"> risk factors: see discussion implementation of overt measures to deter violence such as security guards or barricades between staff and patients might impair doctor-patient trust and antagonize therapeutic relationships with mutual suspicion and misunderstanding spiralling into violence 	
Magin, 2007 (59)	General practise, Australia	not applicable	Occupational violence in general practise	<ul style="list-style-type: none"> risk factors: see discussion planning and training referral of patients to hospitals or other public facilities during out of hour service selective restriction of practise is perceived to compromise the equality of access to care principle and may lead to stigmatisation and discrimination RACGP recommendations summary of recommendation(55) RACGP recognises as well as GPs right to feel and be safe as the willingness of the GP to take care of people who may have a propensity for violence rather than the zero tolerance policy. 	
Naish, 2002 (35)	General Practise London	Medium	30 interviews and 5 focus groups (44 people)	<p>Strategies for incident management and team organization:</p> <ul style="list-style-type: none"> Immediate response: <ul style="list-style-type: none"> Containment and cooperation . Aimed at managing immediate incident, preventing escalation and preserving patient-staff relationship Medium term strategies: <ul style="list-style-type: none"> What lessons can a team learn from an aggressive incident? Adequate incident recording mechanism with agreed threshold for reporting and good support system with opportunities for individual and team debriefing. Long term strategies: <ul style="list-style-type: none"> Improved security for protection of staff , balanced with a welcoming environment for patients. Communication skills training and improved whole team communication Arrange primary care team specific workshops to review experiences , identify systematic weaknesses and formulate solutions on an inclusive multidisciplinary basis. Collective formulation of protocols for managing threatening encounters 	

Table 3: Summary of Reviews and Systematic Reviews

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Calow, 2016 (60)	Emergency Department nursing ED, Psy inpatient setting	Level 3 Low	Review: Evaluation of the use of risk assessment tools in the Emergency Department 13 articles included no studies with RCT design	<ul style="list-style-type: none"> • Use of risk assessment tools in Emergency Department • Does the use of an aggression risk assessment tool reduce the future risk of violence towards the health care worker ? • STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing • BVC: Brøset Violence Checklist inpatient setting, psychiatric units: 6-item tool confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> • prediction of short term violence • reduction of violence 	<ul style="list-style-type: none"> • Lack of high quality studies • Most prevalent risk assessment tools with good validity and sensitivity for early identification of aggressive behaviour: STAMP and BVC • STAMP violence assessment framework has been shown to be an effective tool in early identification of violent behaviour in ED setting (moderate) • BVC is the most prevalent tool in inpatient setting and shows best validity and reliability. (moderate) • there was no reporting on reduction of violence
Kynoch, 2011 (61)	Acute hospital setting nursing ICU ED	Level 3 Low	Systematic Review Interventions for preventing and managing aggressive patients in acute hospital setting 1990-2007 10 articles included no studies with RCT design	<ul style="list-style-type: none"> • staff training • pharmacological treatment • mechanical restraint 	<ul style="list-style-type: none"> • patient aggression • staff injuries, staff confidence, knowledge, attitude, stress • early detection of aggressive behaviour 	<ul style="list-style-type: none"> • Lack of high quality studies • Training results in increased knowledge, skills and confidence to manage aggressive situations. (Low) • Medication helps to reduce the incidence of aggressive behaviour in patients in the acute setting (Moderate) • in acute care setting mechanical restraints have minimal complications when used for short periods of time (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2013(62)	front-line healthcare worker nursing, US	Level 3 Low	Literature Review: Workplace violence prevention: improving front-line healthcare worker safety.	<ul style="list-style-type: none"> Flagging patient with history of violence against staff Training: e.g. web based NIOSH training Workplace Violence Prevention Programme: WVPP 	<ul style="list-style-type: none"> reduction in assault by the patient 	<ul style="list-style-type: none"> Lack of high quality studies 90% reduction in assaults by flagging high risk patients in veteran health care (Moderate) Training is necessary but there is little evidence on impact Complex and mixed findings on effect of WVPP
Runyan, 2000 (30)	Medical Health Care	Level 3 Low	Systematic Review <ul style="list-style-type: none"> studies included were mainly pre- and post - test study design No studies with RCT design 	Behavioural interventions Administrative interventions	<ul style="list-style-type: none"> 41 papers: Sensible Recommended Interventions but no hard data 9 articles reported results of intervention evaluations 	<ul style="list-style-type: none"> Haddon Matrix overall, the research designs employed were weak and the results inconclusive. None used experimental designs Results: <ul style="list-style-type: none"> decline in frequency of assaults after implementation of a peer help programme for assaulted staff (Low) unavailability of debriefing counselling was associated with increased reports of post traumatic stress (Moderate). training programme: conflicting evidence : <ul style="list-style-type: none"> psychiatric setting: training in aggression control technique: likelihood of assault 3% versus 37% in non-trained, but potential bias associated with decision to be trained (Low) no significant differences in assault related injuries

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Reference	Setting	Level/Grade	Study design	Intervention	Outcome	Results (Grade)
						between trained and untrained group (Low) <ul style="list-style-type: none"> psychiatric setting : no significant difference in number of injuries reported from pre- and post test 4 day training (Low) flagging patients with repeated history of violent events 90% reduction in assault by high risk patients in Veterans Administration hospital (Moderate) quality management approach: improvements in inpatient violence.: e.g. 40% reduction in mealtime incidents after changes in lunchroom procedures. (Low)
Price , 2015 (26)	mental health setting mainly nurses Psy	Level 2 Moderate	Systematic Review: 38 relevant studies Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression <ul style="list-style-type: none"> 23 uncontrolled cohort studies 12 controlled cohort studies 3 case control studies 	<ul style="list-style-type: none"> training on violence including de-escalation technique 	<ul style="list-style-type: none"> cognitive outcome affective outcome behaviour change reduced escalations, reduced assault rates, reduced usage containment 	<ul style="list-style-type: none"> Quality of studies moderate to weak Cognitive outcome: enhanced de-escalation knowledge gain (ES: 0.91, 1.13, 1.39), (Moderate) Affective outcome: increased confidence to manage aggression, ES: <0.2, 0.76, 1.04 (Moderate). No evidence on subjective anxiety regulation. Skills: improved de-escalation performance: ES >0.8 (Moderate) Assault rates: mixed outcomes: 3 studies with reduced risk of assault, 2 studies with no significant effect.

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			<ul style="list-style-type: none"> No studies with RCT design 			<ul style="list-style-type: none"> Incidence of aggression: mixed outcomes with increases in aggression possibly due to increased reporting. Significant reduction in incident rates measured at ward level: ES 0.64 Injuries: mixed outcomes. Positive effects in reducing injuries at ward level, not at individual staff level: ES 1.13 Containment: reduced use of physical restraint (Low). non significant reduction in use of rapid tranquilisation (Low), no effect on supply of extra medication (Low) Organisational: reduction in lost workdays: ES 1.47 (Moderate)
Wassell, 2009 (63)	GEN Retail industry	Level 3 Low	Systematic Review Workplace Violence intervention effectiveness	<ul style="list-style-type: none"> interventions in health care and retail industry 		Although the article provides a good overview of the published literature, a more in-depth reporting of the relevant underlying studies is provided in the current systematic review
Morphet, 2018 (64)	GEN		<ul style="list-style-type: none"> Scoping Review Prevention and management of occupational violence and aggression in health care 	<ul style="list-style-type: none"> environmental risk management consumer risk assessment staff education 	<ul style="list-style-type: none"> 20 selected articles 	A more in-depth reporting of the relevant underlying studies is provided in the current systematic review.

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7.	In front of risk of violence, the safety of patients, staff and other patients should be presumed.
				8.	If restraint and seclusion are necessary, not only proper monitoring but the use of quality indicators should be also undertaken.
				9.	In the case of physical restraint, vigilant documented monitoring should be mandatory. Vital signs should be measured every 15 min for 60 min and then every 30 min for 4 h or until awake.
				10.	Physical restraint should be removed as soon as the patient is assessed to not to be dangerous anymore for him/herself and/or others.
				11.	Non-invasive treatments should be preferred over invasive treatments whenever possible.
				12.	Agitated patients should be as much as possible involved in both the selection of the type and the route of administration of any medication.
				13.	The main goal of pharmacological treatment should be to rapidly calm the agitated patient without over-sedation.
				14.	When planning involuntary pharmacological treatment team consent should be reached and the action carefully prepared.
				15.	Oral medications, including solutions and dissolving tablets, should be preferred to intramuscular route in mildly agitated patient.
				16.	A rapid onset of the effect and the reliability of delivery are the two most important factors to consider in choosing a route of administration for the treatment of severe agitation.
				17.	In the case of agitation secondary to alcohol withdrawal treatment with benzodiazepines should be preferred over treatment with antipsychotics.
				18.	In the case of agitation associated with alcohol intoxication, treatment with antipsychotics should be preferred over treatment with benzodiazepines.
				19.	In mild-to-moderate agitation, and when rapid effects of medication are needed, inhaled formulations of antipsychotics may be considered.
				20.	The concomitant use of intramuscular olanzapine and benzodiazepines should be avoided, due to the possible dangerous effects induced by the interaction of the two medications in combination (hypotension, bradycardia, and respiratory depression).
				21.	Intravenous treatment should be avoided except in cases where there is no alternative.

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
wright, 2003 (20)	General practise, UK	Medium	Systematic Review Prevalence and management of violence in primary care	“	22. Elderly agitated patients should be treated with lower doses: usually between a quarter and a half of the standard adult dose. (31)
				<ul style="list-style-type: none"> • Management of violence in Primary care should focus on structural risk factors and interaction at individual level between patient and clinician • Establish a collaborative practise approach. • Be aware of the specific risks for verbal abuse and threats of violence towards the receptionists. • Risk factors are not static but vary according to time, place and situation. • GPs should use their knowledge of the patient to form part of risk assessment. • Perceived risk of violence can exceed the real absolute risk. Balance the risk of excluding patients from primary care versus staff safety <p>Do:</p> <ul style="list-style-type: none"> • Provide panic alarms. • Use a critical incident recording system. • Ensure that waiting area can be seen from the reception desk. • Provide a means of escape that does not involve the path of the patient. • Consult with another team member if conflict is anticipated. • Call the police if an abusive situation seems likely to become violent. • Reflect on one’s own behaviour after each critical incident. • Remove a patient from the list only as a last resort. • Encourage all team members to ‘own’ the potential problem of violence. <p>Do Not:</p> <ul style="list-style-type: none"> • Use grilles, barriers, or glass screens inappropriately. • Leave it to someone else to attend to the problem. • Use physical force to restrain. • Always see yourself as ‘right’ and the other party as ‘wrong” (20) 	
Phillips, 2016 (21)	Health Care different settings, US	Medium	Review article <ul style="list-style-type: none"> • prevalence of WPV type II • Non hospital setting • Hospital setting • Barriers to reporting • Risk Factors 	<ul style="list-style-type: none"> • Although metal detectors may theoretically mitigate violence in the health care workplace, there is no concrete evidence to support this expectation • Lack of supporting evidence on efficacy of preventive measures • Difficulty in designing experiments to test hypothetical interventions • Multifaceted, multidisciplinary approach is necessary and any prevention programme requires individualization and customization. • “Recommendations that have been proposed: 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			<ul style="list-style-type: none"> metal detectors guidelines potential solutions 	<ul style="list-style-type: none"> training in de-escalation techniques and training in self-defence target hardening of infrastructure: security cameras, fences, metal detectors, hiring of guards health care organizations: improve staffing levels during busy periods to reduce crowding and wait times, decrease worker turnover and provide adequate security and mental health personnel on site reporting and redress: verbal assault has been shown to be a risk factor for battery. "The broken window principle": a criminal justice theory that apathy toward low-level crimes creates a neighborhood conducive to more serious crime also applies to workplace violence. "Zero tolerance policy" may prevent escalation." (21) 	
Wax, 2016 (65)	health care US	not applicable	Review Workplace Violence in Health Care: It's Not "Part of the Job".	<ul style="list-style-type: none"> Prevalence: health care workers comprise only 3% of US workforce but experience 60% of all workplace assaults Types of workplace violence Contributors to WPV: see discussion on risk factors Consequences of WPV in healthcare Guideline summary: OSHA(66) Responding to active shooter incident: "run, hide, fight" approach. The human, societal and economic costs of health care WPV are enormous and unacceptable. There are opportunities for professional physician organizations to establish clear policy statements on WPV, to support education on WPV and to assist collaborative state legislative efforts . 	
Gillespie, 2010 (22)	health care workers US	Medium	literature review: Workplace Violence in Healthcare Settings: Risk Factors and Protective Strategies	<ul style="list-style-type: none"> Environmental risk factors: controlled access to patient areas, reduced wait times, security presence, escorting workers to vehicle, security presence, video monitors, cell phone or personal alarm, Organizational policies, zero-tolerance policy. After violent event: support from co-workers, management, debriefing, professional counselling, re-assigning patients when feasible General practitioner: documentation of after hours destination, no house calls to unfamiliar patients. Instructing unknown patients or patients with history of violence to seek health care with a different provider Communication of location at regular intervals with a unit coordinator and a plan to be activated on failure to do so. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Robson, 2007 (38)	general OHSAS system effectiveness different industrial sectors	Medium	systematic review The effectiveness of occupational health and safety management system interventions 13 selected studies	<ul style="list-style-type: none"> • Violence-prevention training on hiring and regular updates ; including recognizing stress in oneself or in patients, de-escalation techniques. • Effective violence-prevention programme • Limiting visitor access to 2 persons <hr/> <ul style="list-style-type: none"> • See discussion • Relatively small quantity of published peer reviewed evidence involving occupational health and safety managements system interventions • Synthesis of evidence showed mostly favourable results, there were a few null findings but no findings of negative effects. • All but one of the studies included had moderate methodological limitations. • Despite the generally positive results on effectiveness of occupational health and safety managements system interventions, the evidence is insufficient to make recommendations either in favour or against . 	

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Overview of relevant guidelines

Table 4 Guidelines

		Country
Occupational Safety and Health Administration, 2016 (66)	Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers	US
Wiskow, 2003(67)	Guidelines on workplace violence in health sector	comparison of different guidelines
The Royal Australian College of General Practitioners, 2015 (55)	General practise – A safe place A guide for the prevention and management of patient-initiated violence	Australia
WorksafeVictoria, 2017 (56)	Prevention and management of violence and aggression in health services	Australia
NICE, 2015 (68)	Violence and aggression: short-term management in mental health, health and community settings NICE, 2015	UK
FOD Binnenlandse Zaken & FOD Volksgezondheid, 2009(69)	een veilige dokterspraktijk	Belgium
Een veilige dokterspraktijk, 2017(70)	Veiligheid voor huisartsen , toolbox 1	

Table 5 risk factors that increase the risk of occupational violence

(54), (62), (53), (31), (71), (23), (65), (57), (19), (34), (4),(21),(59),(20),(22),(72)

Workplace design	<ul style="list-style-type: none"> • Poor delineation between staff-only area and patient area • Lack of controls in accessing staff-only and patient areas • Overcrowded, uncomfortable or noisy waiting rooms • Poor access to exits, toilets and amenities • Poor lighting, blind spots without surveillance • Unsecured furnishings that can be used as weapons
Policies and Work practises	<ul style="list-style-type: none"> • Increased waiting times • Poor customer services from staff • Deficit in staffing levels or inadequate skills mix • Working alone • Lack of violence-prevention programmes • Lack of staff empowerment and shared governance • Lack of follow up of violent episodes by management • Poor safety culture: “broken window principle” • Ineffective mechanisms to warn and ultimately deny service to patients with repeated behaviours of concern • Lack of staff training in de-escalation techniques, • Lack of staff training in etiology and treatment of various pathologies associated with violent behaviour • Use of physical restraints • Mismatch between expectations and services offered: e.g. demands for classified drugs • Presence of drugs, cash or valuable items in the office • Presence of weapons • Refusal to provide a prescription or a sickness or disability certificate • On-call shifts/house visits
Patient factors	<ul style="list-style-type: none"> • Current illness with physiological imbalances or disturbances: <ul style="list-style-type: none"> ○ head trauma ○ encephalitis, meningitis, infection ○ encephalopathy ○ metabolic derangement: hyponatremia, hypocalcemia, hypoglycemia ○ hypoxia ○ thyroid disease ○ seizure (postictal) ○ exposure to environmental toxins ○ toxic levels of medications • Active intoxication, substance dependence, misuse or abuse • Psychosocial stressors • Previous poor experiences with healthcare services • Past history of violence • Psychiatric disorder • Personality, interpersonal style of control or dominance • Frustration , perception not being respected, not being listened to or being treated unfairly • Stress, agitation • Loss of situational control

	<ul style="list-style-type: none"> • Unexpected or high costs of health care • Complex family relationships
Physicians factors	<ul style="list-style-type: none"> • Being unprepared • Education and training: being aware of own body language, knowing how to de-escalate, knowing how to escape • Medical skills • Communication skills • Less years of experience • Physicians own emotions, anger, anxiety, countertransference • Overworked, stressed • Interpersonal style: e.g. assertive style by the physician may challenge the patient's sense of dominance and lead to discomfort and frustration • Gender: no difference in overall risk of violence, increased risk within younger, male GPs for physical assaults • Vulnerability in being a source of risk with respect to legal or licensing matters e.g. with information to third parties beyond direct patient care • Vulnerability : where does the duty of care end in the face of potential violence • Personality traits with increased risk: low agreeableness, high neuroticism, high negative affect, low extroversion, low conscientiousness, low self-esteem
Societal causes / Social context	<ul style="list-style-type: none"> • Poverty, unemployment and social dislocation • Reduced respect for authority, patients are having a greater sense of entitlement than in past and as a consequence frustration in not getting response to demands potentially leads to violence • "Bowling for Columbine effect": spiral of fearfulness, suspicion leading to pre-emptive defensiveness, confrontation and ultimately a greater risk of violence • Population density • Language barriers • Cultural differences

References

1. Hills DJ, Joyce CM, Humphreys JS. A national study of workplace aggression in Australian clinical medical practise. *Med J Aust* [Internet]. 2012;197(6):336–40. Available from: <https://www.mja.com.au/journal/2012/197/6/national-study-workplace-aggression-australian-clinical-medical-practise>
2. Elston MA, Gabe J. Violence in general practise: A gendered risk? *Sociol Heal Illn*. 2016;38(3):426–41.
3. Demeur V, Devos S, Jans E. Agressie tegen de huisarts: De arts in nood. Het profiel van de kwetsbare huisarts. KU LEUVEN; 2017.
4. Vorderwülbecke F, Feistle M, Mehring M, Schneider A, Linde K. Aggression and Violence Against Primary Care Physicians—a Nationwide Questionnaire Survey. *Dtsch Arztebl Int*. 2015;112(10):159–65.
5. Nikathil S, Olausson A, Gocentas RA, Symons E, Mitra B. Review article: Workplace violence in the emergency department: A systematic review and meta analysis. *Emerg Med Australas* [Internet]. 2017;29(3):265–75. Available from: <http://doi.wiley.com/10.1111/1742-6723.12761>
6. Kowalenko T, Cunningham R, Sachs CJ, Gore R, Barata IA, Gates D, et al. Workplace violence in emergency medicine: Current knowledge and future directions. *J Emerg Med* [Internet]. Elsevier Ltd; 2012;43(3):523–31. Available from: <http://dx.doi.org/10.1016/j.jemermed.2012.02.056>
7. Arnetz, Judith E, Lydia H, Russell J. Preventing patient-to-worker violence in hospitals: outcome of a randomised controlled intervention. 59(1):18–27.
8. Moher D, Liberati A, Tetzlaff J, Altman DG, Altman D, Antes G, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;6(7).
9. Higgins JPT GS. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0* The Cochrane Collaboration [Internet]. 2011. Available from: www.handbook.cochrane.org
10. OCEBM Levels of Evidence Working Group, Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, et al. *The Oxford 2011 Levels of Evidence 2*. 2011; Available from: <http://www.cebm.net/index.aspx?o=1025>
11. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schunemann HJ. GRADE: What is “quality of evidence” and why is it important to clinicians? *Bmj*. 2008;336(may):995-8-995-8.
12. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;336(1):924(3).
13. Lewin S, Booth A, Glenton C, Munthe-Kaas H, Rashidian A, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: Introduction to the series. 2018;13(Suppl 1):1–10.
14. Arnetz JE, Hamblin L, Russell J, Upfal MJ, Luborsky M, Janisse J, et al. Preventing Patient-to-Worker Violence in Hospitals: Outcome of a Randomised Controlled Intervention. *J Occup Environ Med*. 2017;59(1):18–27.
15. Lipscomb J, Mcphaul K, Rosen J, Brown JG, Choi M, Soeken K, et al. Violence Prevention in the Mental Health Setting: The New York State Experience. 2006;38:96–117.
16. Mohr DC, Warren N, Hodgson MJ, Drummond DJ. Assault rates and implementation of a workplace violence prevention programme in the veterans health care administration. *J Occup Environ Med*. 2011;53(5):511–6.
17. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy : a repeated cross-sectional study. *BMC Health Serv Res*. 2012;
18. Henson B. Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory. *Violence Vict* [Internet]. 2010;25(4):553–65. Available from: <http://openurl.ingenta.com/content/xref?genre=article&issn=0886-6708&volume=25&issue=4&spage=553>

19. Magin P, Adams J, Joy E, Ireland M, Heaney S, Darab S. Violence in general practise: Perceptions of cause and implications for safety. *Can Fam Physician*. 2008;54(9):1278–84.
20. Wright NMJ, Dixon CAJ, Tompkins CNE. Managing violence in primary care: An evidence-based approach. *Br J Gen Pract*. 2003;53(492):557–62.
21. Phillips JP. Workplace Violence against Health Care Workers in the United States. *N Engl J Med* [Internet]. 2016;374(17):1661–9. Available from: <http://www.nejm.org/doi/10.1056/NEJMra1501998>
22. Gillespie GL, Gates DM, Miller M, Howard PK. Workplace violence in healthcare settings: risk factors and protective strategies. *Rehabil Nurs*. 2010;35(5):177–84.
23. Sim MG, Wain T, Khong E. Aggressive behaviour: Prevention and management in the general practise environment. *Aust Fam Physician*. 2011;40(11):866–72.
24. Ifediora C. Exploring the safety measures by doctors on after-hours house call services. *Australas Med J*. 2015;8(7):239–46.
25. Morken T, Johansen IH. Safety measures to prevent workplace violence in emergency primary care centres – a cross-sectional study. *BMC Health Serv Res* [Internet]. *BMC Health Services Research*; 2013;13(1):1. Available from: *BMC Health Services Research*
26. Price O, Baker J, Bee P, Lovell K. Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry* [Internet]. 2015;206(6):447–55. Available from: <http://bjp.rcpsych.org/cgi/doi/10.1192/bjp.bp.114.144576>
27. Price O, Baker J. Key components of de-escalation techniques: A thematic synthesis. *Int J Ment Health Nurs*. 2012;21(4):310–9.
28. Saragoza P, White SG. Workplace Violence: Practical Considerations for Mental Health Professionals in Consultation, Assessment, and Management of Risk. *Psychiatr Clin North Am* [Internet]. Elsevier Inc; 2016;39(4):599–610. Available from: <http://dx.doi.org/10.1016/j.psc.2016.07.007>
29. Abderhalden C, Needham I, Dassen T, Halfens R, Haug HJ, Fischer JE. Structured risk assessment and violence in acute psychiatric wards: RCT. *Br J Psychiatry*. 2008;193(1):44–50.
30. Runyan CW, Zakocs RC, Zwerling C. Administrative and behavioral interventions for workplace violence prevention. *Am J Prev Med* [Internet]. 2000;18(4):116–27. Available from: <http://www.sciencedirect.com/science/article/pii/S0749379700001471>
31. Garriga M, Pacchiarotti I, Kasper S, Zeller SL, Allen MH, Vázquez G, et al. Assessment and management of agitation in psychiatry: Expert consensus. *World J Biol Psychiatry*. 2016;17(2):86–128.
32. Richmond J, Berlin J, Fishkind A, Holloman G, Zeller S, Wilson M, et al. Verbal De-escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. *West J Emerg Med* [Internet]. 2012;13(1):17–25. Available from: <http://www.escholarship.org/uc/item/55g994m6>
33. Kohlrieser G. Hostage at the table. *Jossy-Bass*; 2006.
34. Geoffrion S, Lanctôt N, Marchand A, Boyer R, Guay S. Predictors of trivialization of workplace violence among healthcare workers and law enforcers. *J Threat Assess Manag* [Internet]. 2015;2(3–4):195–213. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/tam0000048>
35. Naish J, Carter YH, Gray RW, Stevens T, Tissier JM, Gantley MM. Brief encounters of aggression and violence in primary care: a team approach to coping strategies. *Fam Pract* [Internet]. 2002;19(5):504–10. Available from: <http://fampra.oxfordjournals.org/content/19/5/504.abstract%5Cnhttp://fampra.oxfordjournals.org/content/19/5/504.full.pdf>
36. Schat ACH, Kelloway EK. Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. *J Occup Health Psychol* [Internet]. 2003;8(2):110–22. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/1076-8998.8.2.110>

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- 2
- 3 37. Magnavita N. Violence Prevention in a Small-scale Psychiatric Unit: Programme Planning and
- 4 Evaluation. *Int J Occup Environ Health*. 2011;17(4):336–44.
- 5 38. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of
- 6 occupational health and safety management system interventions: A systematic review. *Saf*
- 7 *Sci*. 2007;45(3):329–53.
- 8 39. James S, Cawood C. *Violence Assessment and Intervention: The Practitioner’s Handbook*,
- 9 *Second Edition*. 2009. 377 p.
- 10 40. Runyan CW. Moving forward with research on the prevention of violence against workers. *Am*
- 11 *J Prev Med*. 2001;20(2):169–72.
- 12 41. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical intervention programme
- 13 for dealing with violence towards health care workers. *J Adv Nurs*. 2000;31(3):668–80.
- 14 42. Arnetz JE, Hamblin L, Ager J, Aranyos D, Upfal MJ, Luborsky M, et al. Application and
- 15 implementation of the hazard risk matrix to identify hospital workplaces at risk for violence.
- 16 *Am J Ind Med*. 2014;57(11):1276–84.
- 17 43. Rogers P, Miller G, Paterson B, Bonnett C, Turner P, Brett S, et al. Is breakaway training
- 18 effective? Examining the evidence and the reality. *J Ment Heal Training, Educ Pract*.
- 19 2007;2(2):5–12.
- 20 44. Hvidhjelm J, Sestoft D, Skovgaard LT, Bjorner JB. Sensitivity and specificity of the Broset
- 21 Violence Checklist as predictor of violence in forensic psychiatry. *Nord J Psychiatry*.
- 22 2014;68(8):536–42.
- 23 45. Partridge B, Affleck J. Predicting aggressive patient behaviour in a hospital emergency
- 24 department: An empirical study of security officers using the Brøset Violence Checklist.
- 25 *Australas Emerg Care [Internet]*. College of Emergency Nursing Australasia; 2018;21(1):31–5.
- 26 Available from: <http://linkinghub.elsevier.com/retrieve/pii/S2588994X17300039>
- 27 46. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: A cross-sectional
- 28 study. *Scand J Prim Health Care*. 2012;30(1):55–60.
- 29 47. Nau J, Dassen T, Needham I, Halfens R. The development and testing of a training course in
- 30 aggression for nursing students: A pre-and post-test study. *Nurse Educ Today [Internet]*.
- 31 Elsevier Ltd; 2009;29(2):196–207. Available from:
- 32 <http://dx.doi.org/10.1016/j.nedt.2008.08.011>
- 33 48. Hills DJ, Joyce CM, Humphreys JS. Workplace aggression prevention and minimisation in
- 34 Australian clinical medical practise settings - A national study. *Aust Heal Rev*. 2013;37(5):607–
- 35 13.
- 36 49. Gillespie GL, Gates DM, Mentzel T, Al-Natour A, Kowalenko T. Evaluation of a comprehensive
- 37 ED violence prevention programme. *J Emerg Nurs [Internet]*. Emergency Nurses Association.
- 38 Published by Elsevier Inc. All rights reserved.; 2013;39(4):376–83. Available from:
- 39 <http://dx.doi.org/10.1016/j.jen.2012.12.010>
- 40 50. Holloman G, Zeller S. Overview of Project BETA: Best Practises in Evaluation and Treatment of
- 41 Agitation. *West J Emerg Med [Internet]*. 2012;13(1):1–2. Available from:
- 42 <http://www.escholarship.org/uc/item/4kz5387b>
- 43 51. Stowell K, Florence P, Harman H, Glick R. Psychiatric Evaluation of the Agitated Patient:
- 44 Consensus Statement of the American Association for Emergency Psychiatry Project BETA
- 45 Psychiatric Evaluation Workgroup. *West J Emerg Med [Internet]*. 2012;13(1):11–6. Available
- 46 from: <http://www.escholarship.org/uc/item/9t41z4rb>
- 47 52. Wilson M, Pepper D, Currier G. The psychopharmacology of agitation: consensus statement of
- 48 the American association for emergency psychiatry project. BETA psychopharmacology
- 49 workgroup. *West J Emerg Med [Internet]*. 2012;13(6):536–7. Available from:
- 50 <http://www.escholarship.org/uc/item/2gm874n6>
- 51 53. Morken T, Johansen IH, Alsaker K. Dealing with workplace violence in emergency primary
- 52 health care : a focus group study. *BMC Fam Pract*. 2015;1–7.
- 53 54. Aydin B. Violence Against Practitioners in Turkey. 2009;1980–95.
- 54 55. The Royal Australian College of General Practitioners. *General practise – A safe place. A guide*
- 55

- for the prevention and management of patient-initiated violence. [Internet]. 2015. Available from: <http://www.racgp.org.au/download/documents/PractiseSupport/2011asafeplace-tipsandtools.pdf>
56. WorkSafe Victoria. Prevention and management of violence and aggression in health services. 2017;(2).
57. Zhao S, Qu L, Liu H, Gao L, Jiao M, Liu J, et al. Coping with Workplace Violence against General Practitioners and Nurses in Heilongjiang Province, China: Social Supports and Prevention Strategies. *PLoS One*. 2016;11(6):1–14.
58. Magin P. General practise as a fortress. *Aust Fam Physician*. 2010;39(11).
59. Magin P, Adams J, Joy E. Occupational violence in general practise. *Aust Fam Physician*. 2007;36(11):955–7.
60. Calow N, Lewis A, Showen S, Hall N. Literature Synthesis: Patient Aggression Risk Assessment Tools in the Emergency Department. *J Emerg Nurs* [Internet]. Emergency Nurses Association; 2016;42(1):19–24. Available from: <http://dx.doi.org/10.1016/j.jen.2015.01.023>
61. Kynoch K, Wu CJ, Chang AM. Interventions for preventing and managing aggressive patients admitted to an acute hospital setting: A systematic review. *Worldviews Evidence-Based Nurs*. 2011;8(2):76–86.
62. Lipscomb JA, El Ghaziri M. Workplace Violence Prevention: Improving Front-Line Health-Care Worker and Patient Safety. *NEW Solut A J Environ Occup Heal Policy* [Internet]. 2013;23(2):297–313. Available from: <http://journals.sagepub.com/doi/10.2190/NS.23.2.f>
63. Wassell JT. Workplace violence intervention effectiveness: A systematic literature review. *Saf Sci* [Internet]. Elsevier Ltd; 2009;47(8):1049–55. Available from: <http://dx.doi.org/10.1016/j.ssci.2008.12.001>
64. Morphet J, Griffiths D, Beattie J, Velasquez Reyes D, Innes K. Prevention and management of occupational violence and aggression in healthcare: A scoping review. *Collegian* [Internet]. Australian College of Nursing Ltd; 2018; Available from: <https://doi.org/10.1016/j.colegn.2018.04.003>
65. Wax JR, Pinette MG, Cartin A. Workplace Violence in Health Care-It's Not "Part of the Job". *Obstet Gynecol Surv* [Internet]. 2016;71(7):427–34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27436177>
66. Occupational Safety and Health Administration. Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers. 2016;1–53. Available from: <https://www.osha.gov/Publications/OSHA3148.pdf>
67. Wiskow C. Guidelines on Workplace Violence in the Health Sector, Comparison of major known national guidelines and strategies. *Strategies*. 2003;
68. NICE. Violence and Aggression, Short-Term Management in Mental Health, Health and Community Settings: Updated edition [Internet]. Violence and Aggression: Short-Term Management in Mental Health, Health and Community Settings: Updated edition. 2015. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26180871>
69. FOD Binnenlandse Zaken, FOD Volksgezondheid. Veiligheid voor huisartsen. 2009; Available from: <http://www.veiligheidvanartsen.be/>
70. Een veilige dokterspraktijk [Internet]. 2017. Available from: <https://www.besafe.be/publicaties/een-veilige-dokterspraktijk>
71. Daffern M, Day A, Cookson A. Implications for the prevention of aggressive behavior within psychiatric hospitals drawn from interpersonal communication theory. *Int J Offender Ther Comp Criminol*. 2012;56(3):401–19.
72. Landau SF, Bendalak J, Amitay G, Marcus O. Factors related to negative feelings experienced by emergency department patients and accompanying persons: An Israeli study. *Isr J Health Policy Res*. *Israel Journal of Health Policy Research*; 2018;7(1):1–9.

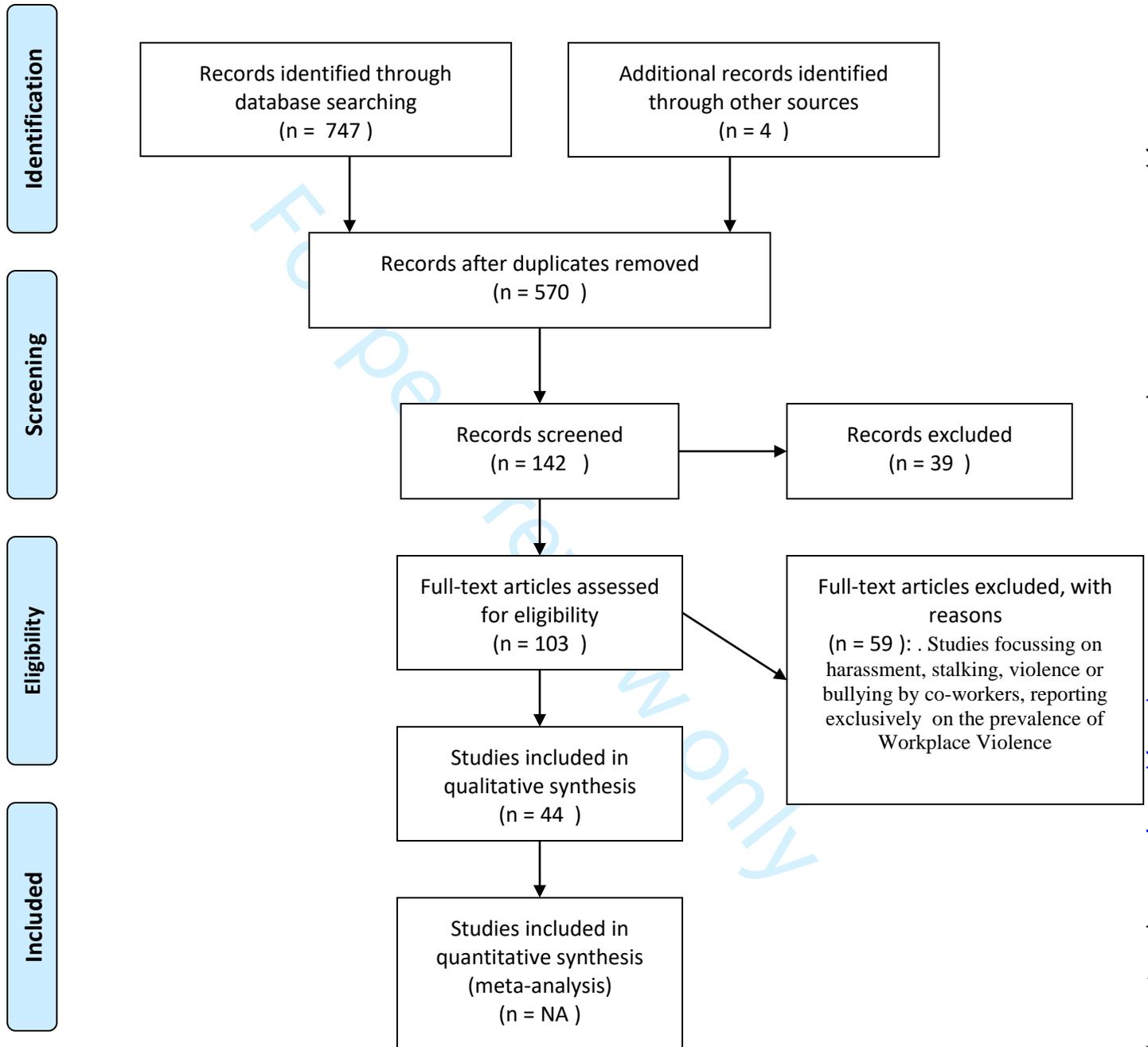
Figure 1: Prisma Flow diagram record screening and inclusion

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PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

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Supplementary Materials: Interventions to prevent aggression against doctors: A Systematic Review

Appendix 1

Details of search strategy						
I preliminary search 3-6 February 2018						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
1	pubmed 3 Feb. 2018	((("physician"[Title/Abstract] OR "general practitioner"[Title/Abstract]) OR "doctor"[Title/Abstract]) AND "aggression"[Title/Abstract])	153	44		
2	pubmed 3 Feb 2018	((("physician"[Title] OR "general practitioner"[Title]) OR "doctor"[Title]) AND "violence"[Title])	79	17		
3	embase 4 Feb 2018	'physician':ab,ti OR 'general practitioner':ab,ti) AND 'aggression':ab,ti	145			
4	embase 6 Feb 2018	Query'physician'/mj AND 'violence'/mj NOT 'domestic violence'/exp Mapped terms"domestic violence" mapped to 'domestic violence', term is exploded articles and review	68			
5	TRIP 4 Feb 2018	physician violence	261	2		
6	Cochrane 4 Feb 2018	"workplace" in Title, Abstract, Keywords and violence in Title, Abstract, Keywords in Other Reviews'	17	0	0	
7	ebmpractice 4 Feb 2018	geweld, agressie	1	1	1	
8	crd 4 Feb 2018	Results for: (violence):TI NOT (domestic):TI NOT (partner):TI IN DARE	23	3		
	<i>subtotal</i>		<i>747</i>	<i>67</i>	<i>46</i>	<i>12</i>
II Systematic Search						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
0	pubmed 15 Feb 2018	Search (((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND prevent*[Title/Abstract] Sort by: Best Mat	53	24	8	4
1	pubmed 15 Feb 2018	((("Workplace Violence"[Mesh]) OR "Aggression"[Mesh]) AND "Health Care Sector"[Mesh])	8	8	3	3
2	pubmed 15 Feb 2018	((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (	19	10	6-3 double =3	0

		"1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND intervert*[Title/Abstract]				
3	pubmed 15 Feb 2018	((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (" 1999/12/31"[PDat] : "2018/02/15"[PDat]))))) AND strateg*[Title/Abstract])	34	8	8-6 double= 2	0
4	pubmed 15 Feb 2018	Search (((((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms])) AND Review[ptyp] AND "last 10 years"[PDat])) NOT domestic violence[MeSH Terms]) AND Review[ptyp] AND "last 10 years"[PDat])) AND prevent*[Title/Abstract]) AND Review[ptyp] AND "last 10 years"[PDat])) AND Review[ptyp] AND "last 10 years"[PDat] AND Humans[Mesh])) NOT youth[MeSH Terms]) NOT abuse, partner[MeSH Terms] Sort by: Best Match Filters: Review; published in the last 10 years; Humans	272	24	14+ 4 snowball -3 double =15	12
5	pubmed 15 Feb 2018	Search (((("General Practitioners"[Mesh]) OR "General Practice"[Mesh]) AND "Violence"[Mesh])) NOT domestic violence[MeSH Terms] Sort by: Best Match Filters: Humans; English	158	46	13-2 double =11	6
6	psycharticle 14 Feb 2018	((ti(aggression) OR ti(violence)) NOT ti(partner) NOT ti(domestic)) AND ti(physician) OR ti(doctor) OR ti(workplace)	26	22	11	3
	extra				4	4
	<i>subtotal</i>		570	142	57	32
	Total				103	44



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	NA



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4-5 and appendix
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Tables
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Tables
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Tables 4-6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	9
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Page 2 of 2

BMJ Open

Interventions to prevent aggression against doctors: A Systematic Review

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Title: Interventions to prevent aggression against doctors: A Systematic Review

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Interventions to prevent aggression against doctors, a Systematic Review

Abstract

Objective: To find out if there is evidence on interventions to prevent aggression against doctors.

Design: This systematic review searched the literature and reported in accordance with PRISMA-guidelines.

Data sources: Pubmed, Embase, TRIP, Cochrane and Psycharticle, GoogleScholar and www.guideline.gov were consulted.

Eligibility Criteria: Abstracts published in English between January 2000 and January 2018 were screened. Eligible studies focussed on prevention and risk factors of type II Workplace Violence in General Healthcare, Psychiatric departments, Emergency Departments, Emergency Primary Care, General Practice.

Data extraction and synthesis: The selected intervention studies were grouped into quantitative and qualitative studies. Systematic Reviews were reported separately. For each study, the design, type of intervention and key findings were analysed. Quality rating was based on GRADE and GRADE-CERQUAL.

Results: 44 studies are included. One RCT provided moderate evidence that a Violence Prevention Programme was effective in decreasing risks of violence. Major risk factors are long waiting times, discrepancy between patients' expectations and services, substance abuse by the patient and a psychiatric condition. Appropriate workplace design and policies aim to reduce risk factors but there is no hard evidence on the effectiveness. One RCT provided evidence that a patient risk assessment combined with tailored actions decreased severe aggression events in psychiatric wards. Applying de-escalation techniques during an aggressive event is highly recommended. Post-incident reporting followed by root cause analysis of the incident provides basic input for review and optimisation of the Violence Prevention Programme.

Conclusions: This review documented interventions to prevent and de-escalate aggression against doctors.

Aggression against physicians is a serious occupational hazard. There is moderate evidence that an integrated Violence Prevention Programme decreases the risks of patient-to-worker violence. The review failed to gather sufficient numeric data to perform a meta-analysis. A large-scale cohort study would add to a better understanding of the effectiveness of interventions.

Strengths and limitations of this study

- As compared to other reviews, this systematic review succeeded in inventorying and documenting all known interventions to prevent and de-escalate aggression against doctors.
- The literature search was performed through a wide range of available medical databases. Research in this area requires quantitative as well as qualitative methodological approaches and therefore both types of publications were included, focussing not only on violence incidence rates but also on the why and how an intervention could work.
- The review failed to gather sufficient numeric data to perform a meta-analysis.

Keywords: aggression, workplace violence, interventions, doctors, general practitioner

Word count 3820

Introduction

Aggression against physicians including verbal, physical and psychological aggression is a well-known and serious occupational hazard. The prevalence of violence in health care is extensively documented in various settings and populations. Subjective interpretation of violent behaviour and underreporting of workplace violence is consistently cited in literature.

A large, nationwide Australian study (MABEL) reported on the 12-month prevalence of verbal or written and physical aggression in Australian clinical medical practice: 70.6% of 9951 Australian doctors experienced verbal or written aggression and 32.3% experienced physical aggression in the previous 12 months. The 12 month prevalence of aggression towards general practitioners was 54.9% for verbal aggression and 23.4% for physical aggression.(1) In a survey in the UK 78% of all general practitioners (GPs) experienced at least one verbal incident in the previous 2 years.(2) A recent cross-sectional study among Flemish GPs showed that only about 5% never encountered aggression. In most cases, the aggression was verbally however, about 20% of the GPs reported physical aggression and almost 8% reported sexual aggression.(3)

A recent nationwide German Survey reported that 91% of GPs faced aggression at least once in their career and 73% in the previous 12 months.(4) Typically, the highest rates of physical aggression were found in emergency departments and in psychiatric units. A recent Systematic Review and meta-analysis showed a pooled incidence of 36 of every 10 000 patient encounters in the emergency department of which 44% was associated with drug and alcohol exposure.(5) More than one quarter of emergency physicians reported that they were victim of physical assault in the past year.(6) A large RCT in hospital setting identified between 8 and 15 reported violence events per 100 full time equivalent staff members per year.(7)

In the health care setting, the most common type of workplace violence is where the aggressor is a patient or a relative of the patient. These events are categorised in literature as “type II workplace violence”. Exposure to work place violence can lead to physical and psychological injury, reduced job satisfaction and detachment and affects the quality of care.

Although the impact of work place related aggression is considerable and well documented, there is no systematic evidence on how to prevent, intervene and approach hazardous situations. Despite the heterogeneity in scientific and event reports about workplace related violence there is consensus that safety action plans should be established and implemented. Therefore, the primary research question in this study is: “What are interventions to prevent aggression against doctors in general and against the general practitioner in particular?”

Methods

This systematic review is performed according to PRISMA guidelines. (8) For the randomised controlled studies the risk of bias was assessed and reported using the Cochrane classification scheme for bias.(9)

Eligibility and inclusion Criteria

Abstracts published in English between January 2000 and April 2019 were screened for inclusion. Eligible studies focussed on prevention of type II Workplace Violence: verbal, physical and psychological aggression from a patient or a patient’s relative towards a health care worker. Studies focussing on ‘aggression’ by co-workers were excluded.

Qualitative and quantitative intervention studies were included. Systematic reviews and Reviews on prevention strategies were included. Single case reports or opinion articles were excluded.

The target population was defined as a health care worker in General Healthcare, Psychiatric departments, Emergency Departments, Emergency Primary Care, General Practice. Eligible

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3 interventions were focussing on risk factors, workplace violence prevention or strategies to reduce
4 workplace violence. Comparison was defined as usual care and as strategy in case of the reporting of
5 a hazardous situation.

6 For evaluation of the effectiveness of intervention, the primary outcome was patient aggression
7 towards healthcare workers. Secondary outcomes were risk factors, staff knowledge, staff skills and
8 early detection of aggressive behaviour. Per type of intervention, the major findings were extracted
9 and discussed.
10
11

12 *Search strategy*

13 Databases utilised were Pubmed, Embase, TRIP, Cochrane and Psycharticle with different search
14 strategies (see appendix). The following search terms/Mesh terms were used: aggression, violence,
15 physician, doctor, workplace, prevent*, strateg*, intervent*, general practitioner, health care. The
16 reference list of articles was scanned additionally. A separate search was performed on Google
17 Scholar and www.guideline.gov using the same search terms.
18
19

20 *Data collection and analysis*

21 The selected intervention studies were grouped into two groups: quantitative and qualitative
22 studies. The Systematic Reviews were reported separately. For each selected study, the design, type
23 of intervention and key findings were analysed. A level of evidence was attributed to each
24 quantitative study based on the Oxford 2011 Levels of Evidence (10). The quantitative studies were
25 rated according to the GRADE (11)(12). For the qualitative studies the GRADE-CERQUAL approach
26 was used to assess quality (13).
27
28

29 *Patient and Public Involvement*

30 Patients were not actively involved in this literature research. In a prior master thesis research, a
31 need assessment was conducted in general practice.
32
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35

36 **Results**

37 The total harvest of articles is presented in appendix 1. In total 105 full text articles were read and
38 assessed for eligibility. 44 studies of which 15 quantitative, 15 qualitative studies, 7 systematic
39 reviews and 7 reviews were included in this review (figure 1).
40
41

42 *Summary of results*

43 The results of the quantitative studies are presented in table 1, the results of the qualitative studies
44 in table 2. Table 3 summarises the Systematic Reviews and other Reviews. Table 4 gives an overview
45 of frequently cited guidelines. Table 5 summarises the factors that may increase the risk of
46 Workplace Violence.
47
48

49 *Studies reporting on Interventions*

50 The interventions most frequently discussed and evaluated are grouped. The first group of
51 interventions was labelled as pre-event preventive measures: components of an integrated violence
52 prevention programme. The second group was labelled as interventions taking place during a violent
53 event: applying de-escalation techniques and activating specific violence emergency procedures. The
54 third group was labelled as post-incident interventions: incident reporting followed by root cause
55 analysis of the incident and review of the violence prevention policy.
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59 *Pre-event preventive measures*

60 Under this label two types of interventions were identified: violence prevention programmes and

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2
3 risk assessment and control measures.
4

5 *Violence Prevention Programmes*

6 A variety of violence prevention programmes has been developed in order to prevent work place
7 violence and to manage and mitigate the impact of violence at work. All programmes propose an
8 integrated approach incorporating basic elements such as a worksite risk analysis, hazard prevention
9 and control measures, safety training and education, violent event reporting and evaluation. Some
10 programmes explicitly apply the Plan-Do-Check-Act model of continuous quality improvement.
11 *Arnetz et al.* investigated in a large RCT the effect of the Plan-Do-Check-Act model through a data
12 driven worksite based intervention in 41 units across seven US hospitals over a period of 5 years. (14)
13 The study provided moderate evidence of this approach in decreasing risks of patient-to-worker
14 violence and related injury at six months post intervention: the incident rate ratio (IRR) of violent
15 events was significantly lower in intervention units compared to control units: IRR 0.48, CI (0.29-
16 0.80). However, this effect was not confirmed over time during the 24-month follow up period. At
17 that time, only the violence related injury was lower in intervention units compared to control units
18 (IRR 0.37, CI (0, 17-0.83)). *Lipscomb et al.* evaluated in a 4-year study the impact of the
19 implementation of the OSHA guidelines and compared three intervention groups with three control
20 groups in mental health facilities. (15) Both the intervention and the control group implemented
21 safety preventions but the control group did not benefit from the additional support of the project
22 team on violence prevention. The staff reported in both groups significant improvements in the
23 OSHA elements: management commitment, employee involvement and hazard assessment and
24 hazard control activities. Intervention facilities also reported significant improvement in the training
25 element. There was no significant reduction in physical assaults in the intervention and the control
26 group. . There was a significant increase in threats in the intervention group (+98%, p<0.001). The
27 authors attribute this unexpected finding to an increased tendency to report less severe events. .
28 *Mohr et al.* investigated in a longitudinal study in 138 Veteran Health Care Facilities the impact of the
29 implementation of a Workplace Violence Prevention Programme (WVPP) .(16) Overall, there was no
30 significant change in assault rates over time. Training led to a significant but moderate 5% reduction
31 in standardised incidence rate. The authors argue that the large variation across the facilities and the
32 underreporting prior to WVP programme explain the results. *Magnavita et al.* studied the effect of
33 an aggression minimization programme in a small-scale psychiatric unit in Italy. The interventions
34 included changes in architecture and work organization and training of employees. A stable and
35 significant reduction in assault rate per employee from 0.24 to 0.04 per year was reported.(17)
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44 *Risk assessment and risk control measures* (Table 5)

45 Violence risk assessment and violence management are intrinsically connected. The risk factors can
46 be categorised based upon their source of origin: workplace design, work organisation, patient
47 factors, physician factors and social context. Numerous studies confirmed the following items as
48 main risk factors for aggression: long waiting times, discrepancy between patients' expectations and
49 the services offered, alcohol or drug abuse by the patient and a psychiatric condition.
50 Subsequent to the specific violence risk assessment, the next step is applying appropriate risk control
51 measures. Changes to the physical environment and work policies are based on situational crime
52 prevention and aim to increase the effort of criminal activity, increase the risk of getting caught,
53 reduce the rewards of criminal activity, reduce provocations and remove excuses for disruptive and
54 violent behaviour.(18)
55 The proposed changes to the physical environment vary across the different health care settings and
56 include effective indoor and outdoor lighting, sufficient exit routes, physical barriers for
57 receptionists, automatic door locks, video cameras, panic buttons, portable alarms and comfortable
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3 waiting areas to reduce stress. No concrete evidence exists on the effectiveness of these
4 interventions.(19) (6)(20)(21)(22) In some emergency departments in the US, metal detectors have
5 been installed, although they may theoretically mitigate violence, there is no concrete evidence to
6 support this assumption.(6)

7
8 Adequate work policies include “zero tolerance” policies, incident reporting, training of staff,
9 adequate staffing, policies on drug prescription and storage, a roadmap when faced with aggressive
10 behaviour and additional measures for out-of-hours services. Drugs, cash and prescriptions should be
11 stored in locked places and in limited amounts. Long waiting times should be managed by expanding
12 the staff during busy periods and by setting up courtesy message systems to alert patients about
13 delay.(21)(23) Some guidelines and studies propose a “zero tolerance policy” with explicit statement
14 and warning signs stating that violence will not be tolerated. It is important to recognise verbal
15 assault as a form of workplace violence since it is a risk factor for physical violence. (21) Some
16 authors advise to restrict or withdraw access to general practice or emergency department services
17 for patients with a history of violence.(18) However, this also might compromise the ‘equality of
18 access to care’ principle and there is no evidence of the impact on violence reduction. General
19 practitioners should take additional measures for after-hours house call services such as using a
20 central dispatch centre or a shared visit schedule and tracking system. Additional support might be
21 provided in certain circumstances or upon request of the GP.

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25 *Ifediora et al.* investigated the implementation of safety measures by GPs on after-hours call services
26 in Australia: overall 43% of the doctors adopted protection measures and for after-hour house calls,
27 34% used additional chaperones or security personnel. The study did not investigate the impact of
28 these measures on violence incidents.(24) *Morken et al.* investigated in a cross sectional study the
29 implementation of 22 safety recommendations in 210 Emergency Primary Care Centres in Norway.
30 The study provided evidence on the perceived usefulness and feasibility of the
31 recommendations.(25)

32
33 Training of staff in communication skills, violence and de-escalation techniques should be included in
34 a comprehensive violence prevention programme. Effective training on de-escalation should focus
35 on cognitive, affective and practical skills based improvements in behaviour and reaction in case of
36 an assault. Self-awareness and the ability to connect interpersonally with the aggressor are crucial.
37 *Price et al* investigated in a systematic review, the cognitive and affective outcome and the
38 effectiveness of training on violence. There is currently limited evidence that this training has an
39 effect on de-escalation of aggressive behaviour.(26) As discussed hereafter, de-escalation is a highly
40 specialised intervention and this might explain the limited effectiveness of the training
41 programmes.(27)

42
43
44 With respect to patient risk factors, the risk of violence is dynamic and contextual.(28) Violence in
45 medical health care is mostly impulsive and accompanied by the fight-flight response although also
46 premeditated aggression occurs. Risk assessment tools focusing on patient aggression have shown to
47 be effective as a predictor for short-term violence. *Abderhalden et al.* investigated in a RCT the use
48 of short-term risk assessment in 14 acute psychiatric wards in Switzerland. The intervention
49 consisted of a structured risk assessment twice daily followed by a communication of risk scores and
50 a recommendation for actions tailored to the risk level. The study showed a significant reduction in
51 severe events of patient aggression, a significant reduction in attacks and a significantly reduced
52 need for coercive measures.(29) Flagging patients with a history of violent events resulted in a 90%
53 reduction in assaults by high risk patients in Veteran Health Care hospitals in US.(30)

Interventions during event

During the event of violence the following recommendations are described in the guidelines: stay calm and apply de-escalation techniques, if de-escalation fails, take care of your own safety, go away or use self-defence techniques and activate the emergency procedure (references in table 4).

The use of restrictive interventions should only be applied in accordance with pre-established protocols and in a manner that complies with the Human Rights.

De-escalation is not only in the medical care sector but also in other settings a highly recommended component of violence prevention. Garriga et al. (table 3) carried out a systematic review on assessment and management of agitation in psychiatry. (31) After identification of possible medical causes for agitation, verbal de-escalation and environmental modification are first choice interventions.

As established by *Richmond et al.*, de-escalation can be successful in less than 5 minutes. Non-coercive de-escalation is executed in a 3- step approach: first, the patient is verbally engaged, second, a collaborative relationship is established and third, the patient is verbally de-escalated out of the agitated state.(32) De-escalation frequently takes the form of a verbal loop in which the clinician listens to the patient, finds a way to respond acknowledging the patient's position and then states what he wants the patient to do. The clinician might have to repeat the loop a dozen or more times and inexperienced clinicians tend to give up.(27)

Similar principles of de-escalation have also been described by *Kohlrieser*, a psychologist and hostage negotiator.(33)

Post-incident measures

As studied by *Geoffrion et al.* individual and organisational factors can lead to trivialization of workplace violence, a culture of silence and underreporting of workplace violence. Two aspects play a role in trivialization of workplace violence: normalisation of violence as being "part of the job" and taboo by avoiding an open discussion out of fear of being stigmatised as incompetent. . Colleague and employer support, training on violence, zero tolerance policy all contribute to normalisation of violence and decrease the likelihood of taboo. Organisations should be aware of this paradox implicitly arisen by sending the message that violence is to be expected.(34)

Reflecting on incidents or performing a root cause analysis in team specific workshops can identify systematic weaknesses and potential solutions, action plans and revision of the WPV policy.(35) Organisations should provide support and assistance to victims and address short and long-term consequences. *Schat et al.* investigated the effect of organisational support in reducing the negative consequences of workplace violence and found a small positive effect on emotional wellbeing, somatic health and job related affect but there was no effect on fear of future violence and on job neglect.(36)

Discussion

Summary of main results

This review demonstrated that only few studies have been successful in providing evidence on the efficacy of interventions to prevent aggression against doctors and more specifically against the general practitioner. Only one RCT provided moderate evidence that a Violence Prevention Programme was effective in decreasing the risks of patient-to-worker violence and of related injury.(14) In contrast, longitudinal studies showed conflicting results in assault rates after implementation of a Workplace Violence Prevention Programme.(16)(37)(30) Appropriate workplace design and work policies aim to reduce risk factors for violence such as long waiting times and crowded waiting areas but there is a lack of evidence on the effectiveness of the interventions.(6)(20)(21)(22) During the event of violence or agitation, applying de-escalation techniques is a highly recommended component of violence prevention. Physical restraint should be considered as a last resort strategy.(31) Post-incident interventions such as incident reporting followed by a root cause analysis of the incident provides the basic input for review and optimisation of the Violence Prevention Programme.

This review included quantitative and qualitative studies, focussing not only on violence incidence rates but also on why and how an intervention works. Although there is a lack of hard evidence on the effectiveness of Occupational Health and Safety Management Systems, there is a wide consensus that the implementation of a comprehensive health and safety prevention plan is the key to understanding, preventing and dealing with Workplace Violence.(38) As stated by *James* in his book *Violence Assessment and Intervention*: 'Preparation is critical as long as you accept that whatever you plan for and however you plan for it to occur, will never happen. Preparation is the "primer" to get you propelled toward resolve and is important in addressing a crisis.'(39)

A work site-specific violence risk assessment provides the basic input for interventions. The focus of prevention and intervention goes to both the clinician and to logistics or infrastructure. Major risk factors for violence are long waiting times, discrepancy between patients' expectations and the services offered, alcohol or drug abuse by the patient or a psychiatric condition. Specific risk control measures on the policy level to ensure adequate staffing and to reduce waiting times and training personnel in de-escalation seem rational interventions even without hard evidence.

The dynamic nature of risks feeds the issue of unintended consequences or the "intervention dilemma". This dilemma states that any intervention has the capacity to either reduce the risk or not affect it or even intensify the risk.(28) On the level of workplace design and work policies, a 100% security will never be obtained. A balance has to be made between safety and quality of life and quality of care.(39) Some interventions proposed to increase safety might be in conflict with the goals of health care. For example, a zero tolerance policy or flagging patients with violent history can lead to stigmatisation of the patient and can be in conflict with patient confidentiality and the right to medical care. Implementation of overt measures such as security guards or barricades between staff and patients might impair the doctor-patient relationship, which can lead to a spiral of fearfulness and suspicion and ultimately to an increased risk on violence. Evidence suggests that individuals carrying an increased risk for violent behaviour are not violent at all times or in all situations.(20)

De-escalation, if undertaken with a sincere commitment and with the goal of "helping the patient calm himself" proved to be successful in far more cases than previously assumed and this strategy can be successful in less than 5 minutes. (31)(32). De-escalation is a complex and time consuming intervention and this might explain the limited effectiveness of the training programmes.(27) Underreporting is a well-known issue in Workplace Violence Management. It is partly due to normalisation of violence as being part of the job and to taboo associated with complaining about violence. Underreporting is also influenced by the interventions themselves and complicates research outcome and the interpretation of results.

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3 Victims of type II Workplace Violence should be assisted and supported by their organisation and
4 short and long term consequences should be addressed.(36) A decline in frequency of assaults occurs
5 after implementation of a peer help programme for assaulted staff. The unavailability of debriefing is
6 associated with increased reports of post-traumatic stress.(40)
7

8 9 *Limitations*

10 The first limitation lies in the risk of bias across studies since mainly English and some French,
11 German and Dutch publications were screened. Second, research on Work Place Violence is not only
12 published in the traditional international medical scientific literature databases. The second
13 limitation is the publication date, the literature search started in 2000. This starting time was chosen
14 ad random. To compensate however for any loss of data before this date, the very comprehensive
15 review of Runyan et al, published in the year 2000 was included in the analysis of this review. The
16 third limitation lies in the risk of bias within studies. Only three randomised controlled trials are
17 included in this review.(14) (29) (41) Performance bias, detection bias and reporting bias are present
18 in all studies. Due to the nature of the problem and of the interventions, allocation concealment,
19 blinding of participants and blinding of outcome is not possible. Also as discussed in this review,
20 underreporting and selective reporting, a well-known issue in Workplace Violence, is variably present
21 in all studies and is influenced by the intervention itself.(14) Recall bias is also present due to data
22 collection inquiring about violent events over the past 12 months.(41) Finally, performance bias is
23 present in all studies through various mechanisms: a medical care setting is a complex structure and
24 organisational changes might have an impact on care quality and on safety performance and might
25 interfere as a co-intervention. Moreover, in all randomised controlled trials, the control group will
26 always have its own safety prevention policy.
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31 32 *Suggestions for further research*

33 We believe that a large and long-term cohort study could provide more insight and evidence on
34 effective interventions to prevent aggression against the general practitioner. Risk factors for type II
35 workplace violence are well known but there are insufficient data on protective factors for
36 aggression against doctors. Analysis of large data sets of a cohort should provide insight in the
37 protective factors and effectiveness of interventions against type II workplace violence.
38 A yearly audit on context of aggression incidents and on the applied safety measures per general
39 practice will add to map effective preventive measures. Basic information about recommended
40 safety prevention measures and training on de-escalation techniques should be offered to the
41 cohort. With respect to post-event interventions, the general practitioners in the study cohort could
42 implement a shared violence incident-reporting tool.
43
44
45

46 47 **Conclusion**

48 Aggression against physicians is a well-known and serious occupational hazard. There is moderate
49 evidence that an integrated Violence Prevention Programme can decrease the risks of patient-to-
50 worker violence. Appropriate workplace design and work policies aiming to reduce risk factors and
51 applying de-escalation techniques during an event of aggression are highly recommended.
52 Considering that detection, reporting and performance bias is inherent to any RCT on interventions
53 against Type II workplace violence, we believe that a large cohort study would provide more
54 evidence on the effectiveness of the interventions.
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3 *Competing interests*

4 There were no competing interests
5

6
7 *Funding*

8 There was no external or internal funding involved in this research.
9

10 *Data availability*

11 Data on the search strategy and the harvest of retrieved articles are available on request.
12
13

14 *Authors' contributions*

15 Ann Raveel: setting up the design and method, data acquisition and analysis, interpretation of data,
16 drafting the paper, approving final version, accountable for the entire work.

17 Birgitte Schoenmakers: delivering the research question, supporting, reviewing and revising the
18 research process, performing data quality check, revising the manuscript for publication, accountable
19 for both the work and the researcher.
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Tables

GP: General Practice, ED: Emergency Department, WPV: Workplace Violence, Psy: Psychiatric setting, Gen: General Health Care, EPC: Emergency Primary Care; ICU: Intensive Care Unit, GER: Geriatrics

Level according to Oxford 2011 levels of evidence.

Outcome quality rating in accordance with GRADE methodology.

Table 1 Summary of selected quantitative studies

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Arnetz et al., 2017 (14)	US, 7 hospitals, 41 units, 2800 employees,	Level 2 Moderate	RCT intervention 5 years, 4 phases Data driven, worksite based intervention plan-do-check-act Hazard Risk Matrix to identify high risk units in intervention and control groups	<ul style="list-style-type: none"> Plan-Do-Check-Act model data driven and worksite based intervention stakeholder involvement 	<ul style="list-style-type: none"> rates of violent events rates of violent related injuries intervention compared to control group evolution over time compared to baseline 	<p>Rates of violent events:</p> <ul style="list-style-type: none"> Six months post intervention, incident rate ratio of violent events (IRR) was significantly lower on intervention units compared to control IRR 0.48 CI (0.29-0.80) Rates of violence decreased slightly but not significantly in the intervention group compared to baseline and increased significantly in the control group compared to baseline. Significantly increased violent event rates at 24 months compared to baseline in both groups: Intervention group from 8 to 13.8 per 100FTE and control group from 8 to 15.4 per 100 FTE. <p>Violence related injuries:</p> <ul style="list-style-type: none"> 24 months post intervention, the violence related injury was lower on intervention units compared to control IRR 0.37 CI (0,17-0.83)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
						Remark: results were not consistent over time during 24 month follow up period.
Abderhalden, 2008 (29)	14 Acute psychiatric wards, 2364 patients Switzerland PSY	Level 2 Moderate	RCT: 14 acute psychiatric wards, 2364 patients phase 1: 3 months baseline data phase 2: 3 months intervention period	<ul style="list-style-type: none"> structured short term risk assessment : Swiss version of Brøset Violence Checklist, 2 times per day during first 3 days in case of high risk (1 in 10 patients will physically attack during next shift): discuss possible prevention measures from list in case of very high risk (1 in 4 patients): multidisciplinary team discussion on preventive measures and plan and implement preventive measures. 	<ul style="list-style-type: none"> risk assessment incident rates staff observation aggression scale attacks coercive measures 	<ul style="list-style-type: none"> Significant reduction in severe events of patient aggression: adjusted risk reduction 41% intervention versus control 15%, $p < 0.001$ Significant reduction in attacks: 41% versus 7%, $p < 0.001$ Significant reduced need for coercive measures : 27% reduction in intervention group versus 10% increase in control, $p < 0.001$ Structured risk assessment twice daily in acutely admitted psychiatric patients combined with a communication of risk scores and a recommendation for action tailored to risk level reduced the incidence rate of coercive measures and severe aggressive incidents.
Arnetz, 2000 (42)	47 health care work places 1500 nurses in Emergency departments, geriatric, psychiatric, home healthcare	Level 3 Low	RCT Implementation and evaluation of a practical intervention programme for dealing with violence towards health care workers.	<ul style="list-style-type: none"> violence incidence form in intervention and control group structured feedback programme in intervention group 	<ul style="list-style-type: none"> awareness of risks of violence ability to deal with aggressive situations exposure to violent incidents 	<ul style="list-style-type: none"> better awareness of risk situations and of how to deal with aggressive patients (Low) 50% increase in incident reporting in intervention group compared to control group (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2006 (15)	Sweden ED, Psy, GER New York State 26 units: 6 units selected Psy	Level 3 Low	<ul style="list-style-type: none"> evaluation of the impact of OSHA guidelines on workers health and safety 3 intervention groups, 3 comparison groups base line and post intervention survey 4 years study 	<ul style="list-style-type: none"> OSHA guidelines serves as framework 1. Management commitment to Violence Prevention Programme 2. Employee involvement in VPP 3. Hazard assessment activities 4. Hazard control activities: infrastructural, organizational, environmental, administrative, behavioural 5. Training 	<ul style="list-style-type: none"> staff perception of quality of programme elements frequency of reported threat and physical assaults in intervention and comparison facility pre- and post-intervention 	<ul style="list-style-type: none"> Staff in both intervention and comparison group reported significant improvements in first 4 elements of the OSHA elements (Low). Intervention facilities reported significant improvement in the training element. (Low) No significant reduction in the change in physical assaults in intervention group nor in comparison group Significant increase in threats of assault in intervention group (+98%, p <0.001), a non significant increase in comparison group (+47%, p= 0.08) remark: Both the intervention and the comparison group did implement safety preventions but the comparison groups did not benefit from the support of the team resources of the worksite violence study.
Magnavita, 2011	small scale psychiatric unit Italy about 85 workers	Level 3 Low	<ul style="list-style-type: none"> pre- and post intervention comparison test 	aggression minimization programme as part of total quality management 1) architecture and work organization: <ul style="list-style-type: none"> rearrangement of building, 3 assistance 	<ul style="list-style-type: none"> Violence Incident Form assault rate: pre and post-intervention 	<ul style="list-style-type: none"> Mean assault rate per employee was significantly reduced from 0.24 per year to 0.04 per year after the intervention Stable decline over time in assaults after the intervention

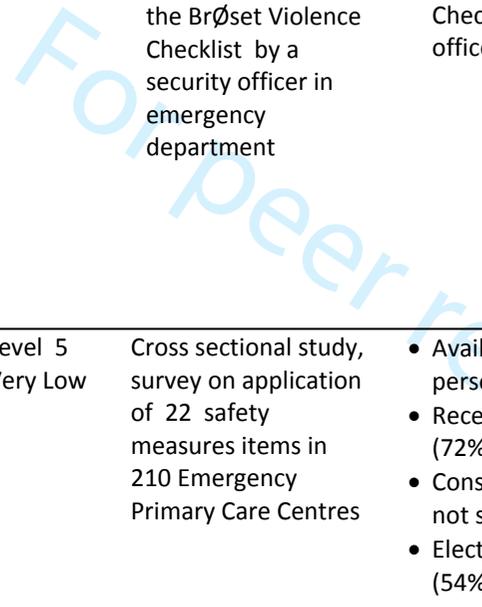
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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Kling, 2011(43)	acute care hospital Canada 109 cases	Level 3, Low	pre- and post – intervention study evaluation of violent risk assessment system and retrospective case control	Violence risk assessment flagging in patient file and on wrist band and violence prevention training taking precautions such as : wearing personal alarm, security team nearby, not entering patient room alone, not having sharp objects	<ul style="list-style-type: none"> • assault rate for aggression using physical force • verbal abuse etc, not addressed • violent incident risk • adjusted OR for violence in flagged patient 	During intervention compared to pre-intervention <ul style="list-style-type: none"> • RR hospital: 0.57 (0.33-1.83) (not significant) • RR direct patient care workers: 0.52 during intervention (0.33-0.81) • RR high risk department: 0.39 (0.24-0.61) Post intervention compared to pre-intervention <ul style="list-style-type: none"> • RR hospital 1.01 (0.989-1.04) • RR direct patient care workers 1.03 (1.00-1.06) • RR high risk department: 1.04 (1.01-1.07) In contrast to hypothesis: <ul style="list-style-type: none"> • adjusted OR for violent incident 6.28 for patients flagged by the Alert System

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Mohr, 2011(16)	138 Veterans Health Care Facilities	Level 3 Low	<ul style="list-style-type: none"> Longitudinal study Impact of implementation of a workplace prevention programme on rates of workplace violence over a period of 6 years: 2004-2009 Relationship of assault rates with WPV dimension score percentage change in assault rates in 2009 compared to 2004 	<ul style="list-style-type: none"> Implementation of a Workplace Violence Prevention Programme WVP dimension score 	<ul style="list-style-type: none"> 43 WVP items, grouped into 3 dimensions : training, workplace practices, environmental control and security standardized assault rate 	<ul style="list-style-type: none"> Overall there was an increase in assault rates over time: from 59 to 71 per 10.000 FTE 34% of facilities had reduced assault rates, average improvement 42% Facilities with no reduction had an average increase of 125% in assault rate Training dimension: significant but moderate 5% reduction on standardised incidence rate (Low) No significant change in assault rates over time possible explanation: <ul style="list-style-type: none"> Large differences in facilities in assault rate reduction or increase Underreporting prior to WVP programme Reduction in severity of assaults (workers compensation claims declined 40% between 2001 and 2008)
Hvidhjelm, 2014 (44)	forensic psychiatry, 156 patients Denmark Psy	Level 3 Low	<ul style="list-style-type: none"> population based observational study sensitivity and specificity of the Brøset Violence Checklist 156 patients, checked 3 times per 	<ul style="list-style-type: none"> BVC 6 items checklist as predictor of short-term (<24u) risk of violence score 6 items: presence or absence of: confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> risk of violence within 24 hours 	BVC showed overall satisfactory specificity and sensitivity as a predictor of short term risk of violence, (Low) score ≥ 3 : <ul style="list-style-type: none"> sensitivity : 65.6%, specificity 99.7% with overall risk 0.3%: PPV score ≥ 1: 17.5%

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			day during 24 months			<ul style="list-style-type: none"> • PPV score ≥ 3: 37% • NPV score < 3: 99.9%
Partridge, 2017 (45)	Emergency Department, 2046 patients Australia ED	Level 3 Low	<ul style="list-style-type: none"> • population based observational study • statistical utility of the Brøset Violence Checklist by a security officer in emergency department 	<ul style="list-style-type: none"> • predicting aggressive patient behaviour using the Brøset Violence Checklist by security officers in ED 	<ul style="list-style-type: none"> • short term risk of violence 	BVC showed a good sensitivity, specificity and predictive value of short term risk of violence, (Low): overall risk 1.7% <ul style="list-style-type: none"> • score ≥ 1: PPV 16.7% , LR+ 11.6 sensitivity 88.6%, specificity 92.4% • score ≥ 2 : PPV 34.2%, LR+ 30.3 sens. 65.7%, spec. 97.8% • score ≥ 3: PPV 55.2 % ,LR+ 71.4 sens. 45.7%, spec. 99.4%
Morken, 2013 (46)	210 Emergency Primary Care Centres Norway GP	Level 5 Very Low	Cross sectional study, survey on application of 22 safety measures items in 210 Emergency Primary Care Centres	<ul style="list-style-type: none"> • Available staff: extra person during home visit when needed (44%), more than one person on duty (30%) • Reception design with glass barrier (86%), view to entrance (62%) and waiting rooms (72%) • Consulting room setup: alternative exit (59%), quick entrance/exit for staff (46%), patient not sitting between clinician and door (29%) • Electronic Safety systems: alarm on medical radio network (74%), automatic door lock (54%), portable alarm (28%), CCTV camera (28%), ... • Training (40%) • Reporting: Monitor and follow up of Violence episodes (75%) • No reporting of number of violent incidents • 98% response rate • No results on effectivity • Application of measures give indication on perceived usefulness of recommendations and feasibility of recommendations 		
Nau, 2009 (47)	63 nursing students attending	Level 5 Very Low	Longitudinal pre- and post test study	<ul style="list-style-type: none"> • 3 days training course 	<ul style="list-style-type: none"> • Confidence in coping with 	<ul style="list-style-type: none"> • Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (Very Low)



Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	training course, Germany		The development and testing of a training course in aggression for nursing students		patient aggression • 10 item scale • no results on actual performance in health care settings	• Training should be seen as a valuable initial step in developing aggression related requirements
Schat, 2003 (36)	Health care setting 225 employees in health care	Level 5 Very Low	organizational support: reducing adverse consequences of workplace aggression Survey, moderated multiple regression	secondary prevention: moderating effect of organizational support: instrumental support (e.g. support from co-workers) and informational support (e.g. training) on negative consequences of workplace aggression and violence	• fear of future violence • emotional well-being • somatic health scale • job related affect • job neglect	• instrumental support: positive effect on variance of (3%-6%) : emotional well-being, somatic health, job related affect. No effect on fear of future violence and job neglect. (Very Low) • information support: positive effect on variance of (3%-6%) emotional well-being, no effect on other outcomes. (Very Low) • no effect on: fear of future violence and job neglect
Chris Ifediora, 2015 (24)	General Practice Australia 300 doctors of National Home Doctors Service after hours house call services GP	not applicable	Survey: exploring the safety measures by doctors on after-hours house call services	• No study of impact on violence incidents • 57% response rate • Safety measures by doctors on after-hours call services: ○ overall 43% of doctors adopted protection measures while on after-hour house calls ○ use of chaperones/security personnel: 34% ○ dependence on surgery policies such as vetting and blacklisting risky patients, documenting doctor's destinations: 31% ○ de-escalation or self-defence techniques: 19% ○ panic buttons:7% ○ personal alarms:6%		
Hills, 2013 (48)	Australia, clinical medical practice,	not applicable	Cross-sectional study, self report survey of	No report on effectivity of measure Implementation of recommendations: 1. policies, protocols for aggression prevention and management: 66%		

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Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
	9449 doctors of which 3515 GPs		implementation of prevention and minimisation actions MABEL survey	<ol style="list-style-type: none"> 2. warning signs in reception: 49% 3. alerts to high risks of aggression: 52% 4. restricting or withdrawing access to services for aggressive persons: 45% 5. incident reporting and follow up: 68% 6. Education & training: 53% 7. Alarms : 47% 8. Clinician escape: 23% 9. optimized lighting, noise level, comfort and waiting time in waiting area: 52% 10. patient access restriction: 62% 11. Building security system: alarm, camera, ...: 70% 12. safety measures for after-hours on-call work or home visits: 34% 		
Geoffrion, 2015 (34)	1141 healthcare workers and law enforcers, Canada GEN	not applicable	Survey : Individual and organizational predictors of trivialization of workplace violence among healthcare workers and law enforcers.		<ul style="list-style-type: none"> • normalisation of violence as being “part of the job” • taboo: avoiding open discussion fear of being stigmatised as incompetent 	<ul style="list-style-type: none"> • discussion on underreporting Individual factors in healthcare: • men are more likely than women to consider WPV as part of the job (34% versus 23%) and perceived a taboo (54% vs. 42%) • Staff with more than 15 years of work experience are more likely to tolerate WPV as part of the job • Organizational factors: colleague and employer support, training, zero tolerance policy contribute to normalisation of violence but decrease the likelihood of taboo

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Table 2: Summary of selected qualitative studies

GRADE-CERQual assessment

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie, 2013 (49)	3 Emergency Departments US 80 employees ED	Medium	Implementation and Evaluation of a sustainable comprehensive department-based ED violence prevention programme. Action research principle: academic researchers partner with clinicians and collaboration with stakeholders	<ul style="list-style-type: none"> WPV policies and procedures: e.g. risk assessment, recordkeeping, response to violent events. WPV education Environmental changes: e.g. panic buttons, lock doors, cameras 	<ul style="list-style-type: none"> Impact on violence rates was not reported Programme fidelity: Variable success in institutionalizing and sustaining intervention subcomponents. Mixed overall evaluation of programme by employees <ul style="list-style-type: none"> Employees rated the programme as moderately beneficial. Surveillance and monitoring environmental changes, education and post incident care were rated as very important Policies and procedures were rated as important Managers and educators programme evaluation: <ul style="list-style-type: none"> Most important components were : surveillance, environmental changes, class room training and post incident-care. WPV assessment screening at triage for all patients was evaluated as least effective There was a low participation level of physicians. Underreporting of violent events
Henson, 2010 (18)	Emergency Departments Situational Crime Prevention in Emergency Departments ED	Medium	Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory	<ul style="list-style-type: none"> Increase the Effort of criminal activity: e.g. secure entrances/exits, metal detectors Increase the Risks of getting caught: e.g. install CCTV cameras Reduce the Rewards of criminal activity: e.g. reduce the amount of prescription drugs carried by staff 	<p>In many EDs these interventions are partially implemented based upon risk assessment and prevention rationale.</p> <p>A systematic test of the proposed prevention techniques is not performed.</p> <p>Remark:</p> <p>1) Situational crime theory is based on rational choice however, violence in healthcare is mostly impulsive and unplanned.</p> <p>2) To deny access to ED if patient is drunk or intoxicated is in conflict with the patients</p>

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				<ul style="list-style-type: none"> Reduce Provocations: e.g. appropriate waiting areas, secure and isolate volatile patients Remove excuses for disruptive and violent behaviour: e.g. clearly post rules of conduct and consequences for breaking them, streamline check –in process form, refuse admission to intoxicated visitors 	fundamental right to healthcare and the physicians duty of care.
Holloman, 2012 (50)	Emergency Psychiatry Psy	Medium	Overview of Project BETA: Best Practices in Evaluation and Treatment of Agitation: to develop guideline including all interventional aspects : triage, diagnosis, verbal de-escalation and medicine choices.	5 study workgroups <ol style="list-style-type: none"> 1. medical evaluation and triage of the agitated patient 2. psychiatric evaluation of the agitated patient 3. Verbal de-escalation of the agitated patient 4. Psychopharmacologic approaches to agitation 5. Use and avoidance of seclusion and restraint 	
Stowell, 2012(51)	Emergency Psychiatry	Medium	BETA project Psychiatric Evaluation of the Agitated Patient.	Prior to attempting de-escalation, a brief evaluation must be aimed at determining the most likely cause of agitation: <ol style="list-style-type: none"> 1. Has the patient an acute medical problem ? 2. Has the patient a delirium ? 3. Has the patient a chronic cognitive impairment that is contributing to the current state of agitation ? 4. Is the patient intoxicated or in withdrawal? 5. Is the patients agitation due to psychosis caused by a known psychiatric disorder? 6. Is the agitation due to nonpsychotic depression or anxiety disorder? 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7. Is the patient simply angry or out of control ? 8. Assess the risk of suicide and violence	
Richmond, 2012 (32)	Emergency Psychiatry	Medium	BETA project Verbal de-escalation of the agitated Patient .	The authors detail the proper foundations for appropriate training for de-escalation using the 10 domains of de-escalation:" 1. Respect the patient and your personal space: maintain at least 2 arm's length of distance 2. Do not be provocative: avoid iatrogenic escalation. Body language and tone of voice should be congruent with what the clinician is saying. 3. Establish verbal contact: Only 1 person verbally interacts with the patient. Introduce yourself to the patient and provide orientation and reassurance, explain that you are there to keep him safe and make sure no harm comes to him or anyone else. 4. Be concise and keep it simple, use short sentences, give the patient time to process and respond. 5. Repetition is essential to successful de-escalation, repeat your message until it is heard, set limits and offer choices, listen actively to the patient and agree with his position whenever possible. 6. Identify wants and feelings: Use free information to identify wants and feelings. Listen closely to what the patient is saying use active listening and Miller's law: you must assume that what the other person is saying is true and try to imagine what it could be true of, this makes you less judgmental and the patient will sense that you are interested in what he is saying and this will improve your relationship 7. Agree with the patient as much as possible or agree to disagree 8. Lay down the law and set clear limits: Establish basic working conditions: communicate these in a matter-of-fact way and not as a threat. This requires that both patient and clinician treat each other with respect. Limit setting must be reasonable and done in a respectful manner. Coach the patient in how to stay in control 9. Offer choices and optimism. Be assertive and propose alternatives to violence. Offer realistic things that will be perceived as acts of kindness such as blankets, drinks... Broach the subject of medication when needed and offer choices to the patient. The goal is not to sedate but to calm down. 10. Debrief the patient and staff"(32)	
Wilson, 2012 (52)	Emergency Psychiatry	Medium	Psychopharmacology of agitation	"	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			BETA project	<ol style="list-style-type: none"> 1. Pharmacologic treatment of agitation should be based on an assessment of the most likely cause for the agitation. If the agitation is from a medical condition or delirium, clinicians should first attempt to treat this underlying cause instead of simply medicating with antipsychotics or benzodiazepines. 2. Oral medications should be offered over intramuscular injections if the patient is cooperative and no medical contraindications to their use exist. 3. Antipsychotics are indicated as first-line management of acute agitation with psychosis of psychiatric origin. 4. When an antipsychotic is indicated for treatment of agitation, certain SGAs (such as olanzapine, risperidone, or ziprasodone), with good evidence to support their efficacy and lack of adverse events, are preferred over haloperidol or other FGAs. Agitation secondary to intoxication with a CNS depressant, such as alcohol, may be an exception in which haloperidol is preferred owing to few data on second-generation antipsychotics in this specific clinical scenario. 5. If haloperidol is used, clinicians should consider administering it with a benzodiazepine to reduce extrapyramidal side effects unless contraindications to use of this medication exist. “(52) 	
Price, 2012 (27)	Process of de-escalating violence and aggression excluding patients with dementia	High	Key components of de-escalation techniques Qualitative research Thematic synthesis	<p>“7 themes</p> <p>Staff skills:</p> <ol style="list-style-type: none"> 1. characteristics of effective de-escalators: open, honest, supportive, self-aware, coherent, non-judgmental and confident without being arrogant 2. maintaining personal control: calmness conveys that the member of the staff is in control of the situation whereas fear can increase anxiety, make the patient feel either unsafe either that they have gained the upper hand. 3. verbal and non verbal skills: calm, gentle, soft tone of voice <p>Process of intervening:</p> <ol style="list-style-type: none"> 4. engaging with the patient: establish a bond 5. when to intervene 6. ensuring safe conditions for de-escalations 7. Strategies for de-escalation <ul style="list-style-type: none"> ○ autonomy confirming interventions <ul style="list-style-type: none"> ○ shared problem solving ○ facilitating expression ○ offering alternatives to aggression 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
					limit setting and authoritative interventions: knowing when to exert control and implement" (27)
Morken, 2015 (53)	Emergency Primary Health Care, Norway 15 nurses and 22 physicians	Medium	Focus group study, qualitative design Dealing with workplace Violence in emergency primary care focusing on organizational factors.	organizational strategies for workplace violence prevention: 1. Minimizing the risk of working alone: a. Having an efficient alarm system with adequate response time to summon someone. b. Regular turning up of colleague. 2. Being prepared: obtain information prior to the consultation, take precautions when facing warning signs, alerting colleagues or police in advance. 3. Resolving mismatch between patient expectations and services offered: e.g. clear and consistent procedures on not handing out drugs to patient and communicate these to the public. 4. Supportive manager response in follow up of a violent episode.	
Moylan, 2017(54)	General practice, Australia	not applicable	Discussion on practical measures to manage the risk of occupational violence based on guidelines from RACGP and WorkSafe Victoria. (55), (56)	multilevel response: 1. workplace design 2. policies and work practices 3. training Before consultation: 4. Is there a quick exit route ? 5. Do you have an alarm mechanism or call for assistance ? 6. Are there patient flags for previous violence ? 7. Are there other client risk factors present ? 8. Is a chaperone required ? During consultation: 9. Are warning signs of violence present ? 10. De escalate versus end consultation ? After the consultation: 11. Has the patient left safely ? 12. Are others in practice safe? 13. Documentation of event ?	
Elston, 2016 (57)	General practice 1300 GPs 13 focus groups 19 in-depth interviews	Medium	Survey, in depth interviews, focus group discussions	<ul style="list-style-type: none"> • No gender difference in overall risk of violence. • Increased risk for physical assaults within younger, male GPs . • Women were more likely to express concerns about violence . • Women consistently adopted more preventive measures than men. • Male and female GPs downplayed the impact of any violence. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
	English National Health Service UK		Gender differences in risk of violence and prevention measures.	<ul style="list-style-type: none"> Male and female GPs spoke of fear and being vulnerable. Fear and the impact of violence: differences in terms and tone between men and women GPs, higher emotional intensity in terms used by women GPs. Sexual assault and harassment: Male and female GPs are confronted with this. Women GPs explicitly suggested their professional standing protected them. Reducing risk and minimising harm: <ul style="list-style-type: none"> GPs strongly opposed to so-called “for dress medicine”. GPs emphasising importance of professionalism and good communication skills to reduce risk and harm. Leaving visit schedule with someone. Check patient notes in advance. Policy adapted such that GPs use at their discretion the opportunity to be accompanied during home visits. 	
Sim, 2011 (23)	General practice, Australia	not applicable	Aggressive behaviour: Prevention and management in the general practice environment	<ul style="list-style-type: none"> Strategies to prevent aggression: <ul style="list-style-type: none"> Staff: friendly, patient focused approach, demonstrating willingness can reduce stimuli for aggressive behaviour System approach to reduce long waiting times: e.g. include emergency appointment slots, courtesy message systems to alert patients about delays, rescheduling late patients.... Management of aggression: <ul style="list-style-type: none"> Recognizing aggressive behaviour. De-escalating early aggression. Limit setting and follow up of incidents. Use of verbal or written behaviour contracts. System approach by applying the plan-do-check act approach. Establish a roadmap to follow when faced with aggressive behaviour. 	
Magin, 2010 (58)	General practice, Australia practice receptionists	medium	Semi-structured interviews Experiences and perceptions of GP receptionists with Perspex and lockdown system.	<ul style="list-style-type: none"> Perspex and lockdown system implemented or not implemented 	<p>Experiences and perceptions of GP receptionists:</p> <ul style="list-style-type: none"> positive perception about the safety measures for reducing risks concern to compromise the feeling of a practice being patient centred by alienating patients from staff and paradoxically increasing the levels of patient violence and staff fearfulness responders from low prevalence practices did not see the need for these measures

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Magin, 2008 (19)	General practice, Australia GP	Medium	Focus group discussions (18GPs) and questionnaire (154 GPs) Underlying and proximate causes of violence	<ul style="list-style-type: none"> risk factors: see discussion implementation of overt measures to deter violence such as security guards or barricades between staff and patients might impair doctor-patient trust and antagonize therapeutic relationships with mutual suspicion and misunderstanding spiralling into violence 	
Magin, 2007 (59)	General practice, Australia	not applicable	Occupational violence in general practice	<ul style="list-style-type: none"> risk factors: see discussion planning and training referral of patients to hospitals or other public facilities during out of hour service selective restriction of practice is perceived to compromise the equality of access to care principle and may lead to stigmatisation and discrimination RACGP recommendations summary of recommendation(55) RACGP recognises as well as GPs right to feel and be safe as the willingness of the GP to take care of people who may have a propensity for violence rather than the zero tolerance policy. 	
Naish, 2002 (35)	General Practice London	Medium	30 interviews and 5 focus groups (44 people)	<p>Strategies for incident management and team organization:</p> <ul style="list-style-type: none"> Immediate response: <ul style="list-style-type: none"> Containment and cooperation . Aimed at managing immediate incident, preventing escalation and preserving patient-staff relationship Medium term strategies: <ul style="list-style-type: none"> What lessons can a team learn from an aggressive incident? Adequate incident recording mechanism with agreed threshold for reporting and good support system with opportunities for individual and team debriefing. Long term strategies: <ul style="list-style-type: none"> Improved security for protection of staff , balanced with a welcoming environment for patients. Communication skills training and improved whole team communication Arrange primary care team specific workshops to review experiences , identify systematic weaknesses and formulate solutions on an inclusive multidisciplinary basis. Collective formulation of protocols for managing threatening encounters 	

Table 3: Summary of Reviews and Systematic Reviews

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Calow, 2016 (60)	Emergency Department nursing ED, Psy inpatient setting	Level 3 Low	Review: Evaluation of the use of risk assessment tools in the Emergency Department 13 articles included no studies with RCT design	<ul style="list-style-type: none"> • Use of risk assessment tools in Emergency Department • Does the use of an aggression risk assessment tool reduce the future risk of violence towards the health care worker ? • STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing • BVC: Brøset Violence Checklist inpatient setting, psychiatric units: 6-item tool confusion, irritability, boisterousness, physical threat, verbal threat, attack on objects 	<ul style="list-style-type: none"> • prediction of short term violence • reduction of violence 	<ul style="list-style-type: none"> • Lack of high quality studies • Most prevalent risk assessment tools with good validity and sensitivity for early identification of aggressive behaviour: STAMP and BVC • STAMP violence assessment framework has been shown to be an effective tool in early identification of violent behaviour in ED setting (moderate) • BVC is the most prevalent tool in inpatient setting and shows best validity and reliability. (moderate) • there was no reporting on reduction of violence
Kynoch, 2011 (61)	Acute hospital setting nursing ICU ED	Level 3 Low	Systematic Review Interventions for preventing and managing aggressive patients in acute hospital setting 1990-2007 10 articles included no studies with RCT design	<ul style="list-style-type: none"> • staff training • pharmacological treatment • mechanical restraint 	<ul style="list-style-type: none"> • patient aggression • staff injuries, staff confidence, knowledge, attitude, stress • early detection of aggressive behaviour 	<ul style="list-style-type: none"> • Lack of high quality studies • Training results in increased knowledge, skills and confidence to manage aggressive situations. (Low) • Medication helps to reduce the incidence of aggressive behaviour in patients in the acute setting (Moderate) • in acute care setting mechanical restraints have minimal complications when used for short periods of time (Low)

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
Lipscomb, 2013(62)	front-line healthcare worker nursing, US	Level 3 Low	Literature Review: Workplace violence prevention: improving front-line healthcare worker safety.	<ul style="list-style-type: none"> Flagging patient with history of violence against staff Training: e.g. web based NIOSH training Workplace Violence Prevention Programme: WVPP 	<ul style="list-style-type: none"> reduction in assault by the patient 	<ul style="list-style-type: none"> Lack of high quality studies 90% reduction in assaults by flagging high risk patients in veteran health care (Moderate) Training is necessary but there is little evidence on impact Complex and mixed findings on effect of WVPP
Runyan, 2000 (30)	Medical Health Care	Level 3 Low	Systematic Review <ul style="list-style-type: none"> studies included were mainly pre- and post - test study design No studies with RCT design 	Behavioural interventions Administrative interventions	<ul style="list-style-type: none"> 41 papers: Sensible Recommended Interventions but no hard data 9 articles reported results of intervention evaluations 	<ul style="list-style-type: none"> Haddon Matrix overall, the research designs employed were weak and the results inconclusive. None used experimental designs Results: <ul style="list-style-type: none"> decline in frequency of assaults after implementation of a peer help programme for assaulted staff (Low) unavailability of debriefing counselling was associated with increased reports of post traumatic stress (Moderate). training programme: conflicting evidence : <ul style="list-style-type: none"> psychiatric setting: training in aggression control technique: likelihood of assault 3% versus 37% in non-trained, but potential bias associated with decision to be trained (Low) no significant differences in assault related injuries

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Reference	Setting	Level/Grade	Study design	Intervention	Outcome	Results (Grade)
						between trained and untrained group (Low) <ul style="list-style-type: none"> psychiatric setting : no significant difference in number of injuries reported from pre- and post test 4 day training (Low) flagging patients with repeated history of violent events 90% reduction in assault by high risk patients in Veterans Administration hospital (Moderate) quality management approach: improvements in inpatient violence.: e.g. 40% reduction in mealtime incidents after changes in lunchroom procedures. (Low)
Price , 2015 (26)	mental health setting mainly nurses Psy	Level 2 Moderate	Systematic Review: 38 relevant studies Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression <ul style="list-style-type: none"> 23 uncontrolled cohort studies 12 controlled cohort studies 3 case control studies 	<ul style="list-style-type: none"> training on violence including de-escalation technique 	<ul style="list-style-type: none"> cognitive outcome affective outcome behaviour change reduced escalations, reduced assault rates, reduced usage containment 	<ul style="list-style-type: none"> Quality of studies moderate to weak Cognitive outcome: enhanced de-escalation knowledge gain (ES: 0.91, 1.13, 1.39), (Moderate) Affective outcome: increased confidence to manage aggression, ES: <0.2, 0.76, 1.04 (Moderate). No evidence on subjective anxiety regulation. Skills: improved de-escalation performance: ES >0.8 (Moderate) Assault rates: mixed outcomes: 3 studies with reduced risk of assault, 2 studies with no significant effect.

Reference	Setting	Level/ Grade	Study design	Intervention	Outcome	Results (Grade)
			<ul style="list-style-type: none"> No studies with RCT design 			<ul style="list-style-type: none"> Incidence of aggression: mixed outcomes with increases in aggression possibly due to increased reporting. Significant reduction in incident rates measured at ward level: ES 0.64 Injuries: mixed outcomes. Positive effects in reducing injuries at ward level, not at individual staff level: ES 1.13 Containment: reduced use of physical restraint (Low). non significant reduction in use of rapid tranquilisation (Low), no effect on supply of extra medication (Low) Organisational: reduction in lost workdays: ES 1.47 (Moderate)
Wassell, 2009 (63)	GEN Retail industry	Level 3 Low	Systematic Review Workplace Violence intervention effectiveness	<ul style="list-style-type: none"> interventions in health care and retail industry 		Although the article provides a good overview of the published literature, a more in-depth reporting of the relevant underlying studies is provided in the current systematic review
Morphet, 2018 (64)	GEN		<ul style="list-style-type: none"> Scoping Review Prevention and management of occupational violence and aggression in health care 	<ul style="list-style-type: none"> environmental risk management consumer risk assessment staff education 	<ul style="list-style-type: none"> 20 selected articles 	A more in-depth reporting of the relevant underlying studies is provided in the current systematic review.

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Kowalenko, 2012 (6)	Emergency Department US Physical assault ED	Low	Review Workplace violence in emergency medicine: Current knowledge and future directions focus on physical assault	<ul style="list-style-type: none"> • Training of staff • Modifications in ED physical structure and security • Changes to policies 	<ul style="list-style-type: none"> • Training leads to increased knowledge and confidence to deal with violence, however a reduction in assaults is not demonstrated • Modification in environment: metal detectors, security dogs, panic buttons, alarm systems, visibility, cameras, physical barriers are commonly used but there is no clear evidence on reduction of violence. • Policies such as zero-tolerance policies, management commitment, reporting of incidents and risk assessment are commonly used but there is no clear evidence on reduction of violence • Specific action plan for ED based on guidelines and recommendations from Occupational Safety and Health Administration (OSHA) • no evidence based policies and interventions
Garriga, 2016 (31)	Agitation in psychiatry International Psy	High	Systematic Review Assessment and management of agitation in psychiatry expert consensus among most cited authors using Delphi method. 124 included studies	22 recommendations: <ul style="list-style-type: none"> • identify possible medical cause • first choice: verbal de-escalation and environmental modification • physical restraint: last resort • pharmacological treatment: calm without over sedation “ <ol style="list-style-type: none"> 1. Agitation with no provisional diagnosis or with no available information should be presumed to be from a general medical condition until proven otherwise. 2. The routine medical examination in an agitated patient should include a complete set of vital signs, blood glucose measurement (finger stick), determination of oxygenation level, and a urine toxicology test. 3. After treating agitation, systematic assessment of sedation levels should be performed. 4. The initial approach to a patient with agitation should always start with verbal de-escalation, environmental modifications and other strategies that focus on the engagement of the patient and not on physical restraint. 5. Verbal de-escalation should be always used in cases of mild-to-moderate agitation, thus avoiding the need for physical restraint. 6. Physical restraint should only be used as a last resort strategy when it is the only means available to prevent imminent harm. 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
				7.	In front of risk of violence, the safety of patients, staff and other patients should be presumed.
				8.	If restraint and seclusion are necessary, not only proper monitoring but the use of quality indicators should be also undertaken.
				9.	In the case of physical restraint, vigilant documented monitoring should be mandatory. Vital signs should be measured every 15 min for 60 min and then every 30 min for 4 h or until awake.
				10.	Physical restraint should be removed as soon as the patient is assessed to not to be dangerous anymore for him/herself and/or others.
				11.	Non-invasive treatments should be preferred over invasive treatments whenever possible.
				12.	Agitated patients should be as much as possible involved in both the selection of the type and the route of administration of any medication.
				13.	The main goal of pharmacological treatment should be to rapidly calm the agitated patient without over-sedation.
				14.	When planning involuntary pharmacological treatment team consent should be reached and the action carefully prepared.
				15.	Oral medications, including solutions and dissolving tablets, should be preferred to intramuscular route in mildly agitated patient.
				16.	A rapid onset of the effect and the reliability of delivery are the two most important factors to consider in choosing a route of administration for the treatment of severe agitation.
				17.	In the case of agitation secondary to alcohol withdrawal treatment with benzodiazepines should be preferred over treatment with antipsychotics.
				18.	In the case of agitation associated with alcohol intoxication, treatment with antipsychotics should be preferred over treatment with benzodiazepines.
				19.	In mild-to-moderate agitation, and when rapid effects of medication are needed, inhaled formulations of antipsychotics may be considered.
				20.	The concomitant use of intramuscular olanzapine and benzodiazepines should be avoided, due to the possible dangerous effects induced by the interaction of the two medications in combination (hypotension, bradycardia, and respiratory depression).
				21.	Intravenous treatment should be avoided except in cases where there is no alternative.

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
wright, 2003 (20)	General practice, UK	Medium	Systematic Review Prevalence and management of violence in primary care	“	22. Elderly agitated patients should be treated with lower doses: usually between a quarter and a half of the standard adult dose. (31)
				<ul style="list-style-type: none"> • Management of violence in Primary care should focus on structural risk factors and interaction at individual level between patient and clinician • Establish a collaborative practice approach. • Be aware of the specific risks for verbal abuse and threats of violence towards the receptionists. • Risk factors are not static but vary according to time, place and situation. • GPs should use their knowledge of the patient to form part of risk assessment. • Perceived risk of violence can exceed the real absolute risk. Balance the risk of excluding patients from primary care versus staff safety <p>Do:</p> <ul style="list-style-type: none"> • Provide panic alarms. • Use a critical incident recording system. • Ensure that waiting area can be seen from the reception desk. • Provide a means of escape that does not involve the path of the patient. • Consult with another team member if conflict is anticipated. • Call the police if an abusive situation seems likely to become violent. • Reflect on one’s own behaviour after each critical incident. • Remove a patient from the list only as a last resort. • Encourage all team members to ‘own’ the potential problem of violence. <p>Do Not:</p> <ul style="list-style-type: none"> • Use grilles, barriers, or glass screens inappropriately. • Leave it to someone else to attend to the problem. • Use physical force to restrain. • Always see yourself as ‘right’ and the other party as ‘wrong” (20) 	
Phillips, 2016 (21)	Health Care different settings, US	Medium	Review article <ul style="list-style-type: none"> • prevalence of WPV type II • Non hospital setting • Hospital setting • Barriers to reporting • Risk Factors 	<ul style="list-style-type: none"> • Although metal detectors may theoretically mitigate violence in the health care workplace, there is no concrete evidence to support this expectation • Lack of supporting evidence on efficacy of preventive measures • Difficulty in designing experiments to test hypothetical interventions • Multifaceted, multidisciplinary approach is necessary and any prevention programme requires individualization and customization. • “Recommendations that have been proposed: 	

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Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
			<ul style="list-style-type: none"> • metal detectors • guidelines • potential solutions 	<ul style="list-style-type: none"> ○ training in de-escalation techniques and training in self-defence ○ target hardening of infrastructure: security cameras, fences, metal detectors, hiring of guards ○ health care organizations: improve staffing levels during busy periods to reduce crowding and wait times, decrease worker turnover and provide adequate security and mental health personnel on site ○ reporting and redress: verbal assault has been shown to be a risk factor for battery. "The broken window principle": a criminal justice theory that apathy toward low-level crimes creates a neighborhood conducive to more serious crime also applies to workplace violence. ○ "Zero tolerance policy" may prevent escalation." (21) 	
Wax, 2016 (65)	health care US	not applicable	Review Workplace Violence in Health Care: It's Not "Part of the Job".	<ul style="list-style-type: none"> • Prevalence: health care workers comprise only 13% of US workforce but experience 60% of all workplace assaults • Types of workplace violence • Contributors to WPV: see discussion on risk factors • Consequences of WPV in healthcare • Guideline summary: OSHA(66) • Responding to active shooter incident: "run, hide, fight" approach. • The human, societal and economic costs of health care WPV are enormous and unacceptable. • There are opportunities for professional physician organizations to establish clear policy statements on WPV, to support education on WPV and to assist collaborative state legislative efforts . 	
Gillespie, 2010 (22)	health care workers US	Medium	literature review: Workplace Violence in Healthcare Settings: Risk Factors and Protective Strategies	<ul style="list-style-type: none"> • Environmental risk factors: controlled access to patient areas, reduced wait times, security presence, escorting workers to vehicle, security presence, video monitors, cell phone or personal alarm, • Organizational policies, zero-tolerance policy. • After violent event: support from co-workers, management, debriefing, professional counselling, re-assigning patients when feasible • General practitioner: documentation of after hours destination, no house calls to unfamiliar patients. Instructing unknown patients or patients with history of violence to seek health care with a different provider • Communication of location at regular intervals with a unit coordinator and a plan to be activated on failure to do so. 	

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Robson, 2007 (38)	general OHSAS system effectiveness different industrial sectors	Medium	systematic review The effectiveness of occupational health and safety management system interventions 13 selected studies	<ul style="list-style-type: none"> • Violence-prevention training on hiring and regular updates ; including recognizing stress in oneself or in patients, de-escalation techniques. • Effective violence-prevention programme • Limiting visitor access to 2 persons <hr/> <ul style="list-style-type: none"> • See discussion • Relatively small quantity of published peer reviewed evidence involving occupational health and safety managements system interventions • Synthesis of evidence showed mostly favourable results, there were a few null findings but no findings of negative effects. • All but one of the studies included had moderate methodological limitations. • Despite the generally positive results on effectiveness of occupational health and safety managements system interventions, the evidence is insufficient to make recommendations either in favour or against . 	

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Overview of relevant guidelines

Table 4 Guidelines

		Country
Occupational Safety and Health Administration, 2016 (66)	Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers	US
Wiskow, 2003(67)	Guidelines on workplace violence in health sector	comparison of different guidelines
The Royal Australian College of General Practitioners, 2015 (55)	General practice – A safe place A guide for the prevention and management of patient-initiated violence	Australia
WorksafeVictoria, 2017 (56)	Prevention and management of violence and aggression in health services	Australia
NICE, 2015 (68)	Violence and aggression: short-term management in mental health, health and community settings NICE, 2015	UK
FOD Binnenlandse Zaken & FOD Volksgezondheid, 2009(69)	een veilige dokterspraktijk	Belgium
Een veilige dokterspraktijk, 2017(70)	Veiligheid voor huisartsen , toolbox 1	

Table 5 risk factors that increase the risk of occupational violence

(54), (62), (53), (31), (71), (23), (65), (57), (19), (34), (4),(21),(59),(20),(22),(72)

Workplace design	<ul style="list-style-type: none"> • Poor delineation between staff-only area and patient area • Lack of controls in accessing staff-only and patient areas • Overcrowded, uncomfortable or noisy waiting rooms • Poor access to exits, toilets and amenities • Poor lighting, blind spots without surveillance • Unsecured furnishings that can be used as weapons
Policies and Work practices	<ul style="list-style-type: none"> • Increased waiting times • Poor customer services from staff • Deficit in staffing levels or inadequate skills mix • Working alone • Lack of violence-prevention programmes • Lack of staff empowerment and shared governance • Lack of follow up of violent episodes by management • Poor safety culture: “broken window principle” • Ineffective mechanisms to warn and ultimately deny service to patients with repeated behaviours of concern • Lack of staff training in de-escalation techniques • Lack of staff training in etiology and treatment of various pathologies associated with violent behaviour • Use of physical restraints • Mismatch between expectations and services offered: e.g. demands for classified drugs • Presence of drugs, cash or valuable items in the office • Presence of weapons • Refusal to provide a prescription or a sickness or disability certificate • On-call shifts/house visits
Patient factors	<ul style="list-style-type: none"> • Current illness with physiological imbalances or disturbances: <ul style="list-style-type: none"> ○ head trauma ○ encephalitis, meningitis, infection ○ encephalopathy ○ metabolic derangement: hyponatremia, hypocalcemia, hypoglycemia ○ hypoxia ○ thyroid disease ○ seizure (postictal) ○ exposure to environmental toxins ○ toxic levels of medications • Active intoxication, substance dependence, misuse or abuse • Psychosocial stressors • Previous poor experiences with healthcare services • Past history of violence • Psychiatric disorder • Personality, interpersonal style of control or dominance • Frustration, perception not being respected, not being listened to or being treated unfairly • Stress, agitation • Loss of situational control

	<ul style="list-style-type: none"> • Unexpected or high costs of health care • Complex family relationships
Physicians factors	<ul style="list-style-type: none"> • Being unprepared • Lack of education and training on violence: being unaware of own body language, not knowing how to de-escalate, not knowing how to escape • Inadequate medical skills • Poor communication skills • Less years of experience • Physicians own emotions, anger, anxiety, countertransference • Overworked, stressed • Interpersonal style: e.g. assertive style by the physician may challenge the patient's sense of dominance and lead to discomfort and frustration • Gender: no difference in overall risk of violence, increased risk within younger, male GPs for physical assaults • Vulnerability in being a source of risk with respect to legal or licensing matters e.g. with information to third parties beyond direct patient care • Vulnerability : where does the duty of care end in the face of potential violence? • Personality traits with increased risk: low agreeableness, high neuroticism, high negative affect, low extroversion, low conscientiousness, low self-esteem
Societal causes / Social context	<ul style="list-style-type: none"> • Poverty, unemployment and social dislocation • Reduced respect for authority, patients are having a greater sense of entitlement than in the past and as a consequence frustration in not getting response to demands potentially leads to violence • "Bowling for Columbine effect": spiral of fearfulness, suspicion leading to pre-emptive defensiveness, confrontation and ultimately a greater risk of violence • Population density • Language barriers • Cultural differences

References

1. Hills DJ, Joyce CM, Humphreys JS. A national study of workplace aggression in Australian clinical medical practice. *Med J Aust* [Internet]. 2012;197(6):336–40. Available from: <https://www.mja.com.au/journal/2012/197/6/national-study-workplace-aggression-australian-clinical-medical-practice>
2. Elston MA, Gabe J. Violence in general practice: A gendered risk? *Sociol Heal Illn*. 2016;38(3):426–41.
3. Demeur V, Devos S, Jans E. Agressie tegen de huisarts: De arts in nood. Het profiel van de kwetsbare huisarts. KU LEUVEN; 2017.
4. Vorderwülbecke F, Feistle M, Mehring M, Schneider A, Linde K. Aggression and Violence Against Primary Care Physicians—a Nationwide Questionnaire Survey. *Dtsch Arztebl Int*. 2015;112(10):159–65.
5. Nikathil S, Olausson A, Gocentas RA, Symons E, Mitra B. Review article: Workplace violence in the emergency department: A systematic review and meta analysis. *Emerg Med Australas* [Internet]. 2017;29(3):265–75. Available from: <http://doi.wiley.com/10.1111/1742-6723.12761>
6. Kowalenko T, Cunningham R, Sachs CJ, Gore R, Barata IA, Gates D, et al. Workplace violence in emergency medicine: Current knowledge and future directions. *J Emerg Med* [Internet]. Elsevier Ltd; 2012;43(3):523–31. Available from: <http://dx.doi.org/10.1016/j.jemermed.2012.02.056>
7. Arnetz, Judith E, Lydia H, Russell J. Preventing patient-to-worker violence in hospitals: outcome of a randomised controlled intervention. 59(1):18–27.
8. Moher D, Liberati A, Tetzlaff J, Altman DG, Altman D, Antes G, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;6(7).
9. Higgins JPT GS. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0* The Cochrane Collaboration [Internet]. 2011. Available from: www.handbook.cochrane.org
10. OCEBM Levels of Evidence Working Group, Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, et al. *The Oxford 2011 Levels of Evidence 2*. 2011; Available from: <http://www.cebm.net/index.aspx?o=1025>
11. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schunemann HJ. GRADE: What is “quality of evidence” and why is it important to clinicians? *Bmj*. 2008;336(may):995-8-995-8.
12. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;336(1):924(3).
13. Lewin S, Booth A, Glenton C, Munthe-Kaas H, Rashidian A, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: Introduction to the series. 2018;13(Suppl 1):1–10.
14. Arnetz JE, Hamblin L, Russell J, Upfal MJ, Luborsky M, Janisse J, et al. Preventing Patient-to-Worker Violence in Hospitals: Outcome of a Randomised Controlled Intervention. *J Occup Environ Med*. 2017;59(1):18–27.
15. Lipscomb J, Mcphaul K, Rosen J, Brown JG, Choi M, Soeken K, et al. Violence Prevention in the Mental Health Setting: The New York State Experience. 2006;38:96–117.
16. Mohr DC, Warren N, Hodgson MJ, Drummond DJ. Assault rates and implementation of a workplace violence prevention programme in the veterans health care administration. *J Occup Environ Med*. 2011;53(5):511–6.
17. Magnavita N, Heponiemi T. Violence towards health care workers in a Public Health Care Facility in Italy : a repeated cross-sectional study. *BMC Health Serv Res*. 2012;
18. Henson B. Preventing Interpersonal Violence in Emergency Departments: Practical Applications of Criminology Theory. *Violence Vict* [Internet]. 2010;25(4):553–65. Available from: <http://openurl.ingenta.com/content/xref?genre=article&issn=0886-6708&volume=25&issue=4&spage=553>

19. Magin P, Adams J, Joy E, Ireland M, Heaney S, Darab S. Violence in general practice: Perceptions of cause and implications for safety. *Can Fam Physician*. 2008;54(9):1278–84.
20. Wright NMJ, Dixon CAJ, Tompkins CNE. Managing violence in primary care: An evidence-based approach. *Br J Gen Pract*. 2003;53(492):557–62.
21. Phillips JP. Workplace Violence against Health Care Workers in the United States. *N Engl J Med* [Internet]. 2016;374(17):1661–9. Available from: <http://www.nejm.org/doi/10.1056/NEJMra1501998>
22. Gillespie GL, Gates DM, Miller M, Howard PK. Workplace violence in healthcare settings: risk factors and protective strategies. *Rehabil Nurs*. 2010;35(5):177–84.
23. Sim MG, Wain T, Khong E. Aggressive behaviour: Prevention and management in the general practice environment. *Aust Fam Physician*. 2011;40(11):866–72.
24. Ifediora C. Exploring the safety measures by doctors on after-hours house call services. *Australas Med J*. 2015;8(7):239–46.
25. Morken T, Johansen IH. Safety measures to prevent workplace violence in emergency primary care centres – a cross-sectional study. *BMC Health Serv Res* [Internet]. *BMC Health Services Research*; 2013;13(1):1. Available from: *BMC Health Services Research*
26. Price O, Baker J, Bee P, Lovell K. Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry* [Internet]. 2015;206(6):447–55. Available from: <http://bjp.rcpsych.org/cgi/doi/10.1192/bjp.bp.114.144576>
27. Price O, Baker J. Key components of de-escalation techniques: A thematic synthesis. *Int J Ment Health Nurs*. 2012;21(4):310–9.
28. Saragoza P, White SG. Workplace Violence: Practical Considerations for Mental Health Professionals in Consultation, Assessment, and Management of Risk. *Psychiatr Clin North Am* [Internet]. Elsevier Inc; 2016;39(4):599–610. Available from: <http://dx.doi.org/10.1016/j.psc.2016.07.007>
29. Abderhalden C, Needham I, Dassen T, Halfens R, Haug HJ, Fischer JE. Structured risk assessment and violence in acute psychiatric wards: RCT. *Br J Psychiatry*. 2008;193(1):44–50.
30. Runyan CW, Zakocs RC, Zwerling C. Administrative and behavioral interventions for workplace violence prevention. *Am J Prev Med* [Internet]. 2000;18(4):116–27. Available from: <http://www.sciencedirect.com/science/article/pii/S0749379700001471>
31. Garriga M, Pacchiarotti I, Kasper S, Zeller SL, Allen MH, Vázquez G, et al. Assessment and management of agitation in psychiatry: Expert consensus. *World J Biol Psychiatry*. 2016;17(2):86–128.
32. Richmond J, Berlin J, Fishkind A, Holloman G, Zeller S, Wilson M, et al. Verbal De-escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. *West J Emerg Med* [Internet]. 2012;13(1):17–25. Available from: <http://www.escholarship.org/uc/item/55g994m6>
33. Kohlrieser G. Hostage at the table. *Jossy-Bass*; 2006.
34. Geoffrion S, Lanctôt N, Marchand A, Boyer R, Guay S. Predictors of trivialization of workplace violence among healthcare workers and law enforcers. *J Threat Assess Manag* [Internet]. 2015;2(3–4):195–213. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/tam0000048>
35. Naish J, Carter YH, Gray RW, Stevens T, Tissier JM, Gantley MM. Brief encounters of aggression and violence in primary care: a team approach to coping strategies. *Fam Pract* [Internet]. 2002;19(5):504–10. Available from: <http://fampra.oxfordjournals.org/content/19/5/504.abstract%5Cnhttp://fampra.oxfordjournals.org/content/19/5/504.full.pdf>
36. Schat ACH, Kelloway EK. Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. *J Occup Health Psychol* [Internet]. 2003;8(2):110–22. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/1076-8998.8.2.110>

- 1
- 2
- 3 37. Magnavita N. Violence Prevention in a Small-scale Psychiatric Unit: Programme Planning and
- 4 Evaluation. *Int J Occup Environ Health*. 2011;17(4):336–44.
- 5 38. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of
- 6 occupational health and safety management system interventions: A systematic review. *Saf*
- 7 *Sci*. 2007;45(3):329–53.
- 8 39. James S, Cawood C. *Violence Assessment and Intervention: The Practitioner’s Handbook*,
- 9 *Second Edition*. 2009. 377 p.
- 10 40. Runyan CW. Moving forward with research on the prevention of violence against workers. *Am*
- 11 *J Prev Med*. 2001;20(2):169–72.
- 12 41. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical intervention programme
- 13 for dealing with violence towards health care workers. *J Adv Nurs*. 2000;31(3):668–80.
- 14 42. Arnetz JE, Hamblin L, Ager J, Aranyos D, Upfal MJ, Luborsky M, et al. Application and
- 15 implementation of the hazard risk matrix to identify hospital workplaces at risk for violence.
- 16 *Am J Ind Med*. 2014;57(11):1276–84.
- 17 43. Rogers P, Miller G, Paterson B, Bonnett C, Turner P, Brett S, et al. Is breakaway training
- 18 effective? Examining the evidence and the reality. *J Ment Heal Training, Educ Pract*.
- 19 2007;2(2):5–12.
- 20 44. Hvidhjelm J, Sestoft D, Skovgaard LT, Bjorner JB. Sensitivity and specificity of the Broset
- 21 Violence Checklist as predictor of violence in forensic psychiatry. *Nord J Psychiatry*.
- 22 2014;68(8):536–42.
- 23 45. Partridge B, Affleck J. Predicting aggressive patient behaviour in a hospital emergency
- 24 department: An empirical study of security officers using the Brøset Violence Checklist.
- 25 *Australas Emerg Care [Internet]*. College of Emergency Nursing Australasia; 2018;21(1):31–5.
- 26 Available from: <http://linkinghub.elsevier.com/retrieve/pii/S2588994X17300039>
- 27 46. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: A cross-sectional
- 28 study. *Scand J Prim Health Care*. 2012;30(1):55–60.
- 29 47. Nau J, Dassen T, Needham I, Halfens R. The development and testing of a training course in
- 30 aggression for nursing students: A pre-and post-test study. *Nurse Educ Today [Internet]*.
- 31 Elsevier Ltd; 2009;29(2):196–207. Available from:
- 32 <http://dx.doi.org/10.1016/j.nedt.2008.08.011>
- 33 48. Hills DJ, Joyce CM, Humphreys JS. Workplace aggression prevention and minimisation in
- 34 Australian clinical medical practice settings - A national study. *Aust Heal Rev*. 2013;37(5):607–
- 35 13.
- 36 49. Gillespie GL, Gates DM, Mentzel T, Al-Natour A, Kowalenko T. Evaluation of a comprehensive
- 37 ED violence prevention programme. *J Emerg Nurs [Internet]*. Emergency Nurses Association.
- 38 Published by Elsevier Inc. All rights reserved.; 2013;39(4):376–83. Available from:
- 39 <http://dx.doi.org/10.1016/j.jen.2012.12.010>
- 40 50. Holloman G, Zeller S. Overview of Project BETA: Best Practices in Evaluation and Treatment of
- 41 Agitation. *West J Emerg Med [Internet]*. 2012;13(1):1–2. Available from:
- 42 <http://www.escholarship.org/uc/item/4kz5387b>
- 43 51. Stowell K, Florence P, Harman H, Glick R. Psychiatric Evaluation of the Agitated Patient:
- 44 Consensus Statement of the American Association for Emergency Psychiatry Project BETA
- 45 Psychiatric Evaluation Workgroup. *West J Emerg Med [Internet]*. 2012;13(1):11–6. Available
- 46 from: <http://www.escholarship.org/uc/item/9t41z4rb>
- 47 52. Wilson M, Pepper D, Currier G. The psychopharmacology of agitation: consensus statement of
- 48 the American association for emergency psychiatry project. BETA psychopharmacology
- 49 workgroup. *West J Emerg Med [Internet]*. 2012;13(6):536–7. Available from:
- 50 <http://www.escholarship.org/uc/item/2gm874n6>
- 51 53. Morken T, Johansen IH, Alsaker K. Dealing with workplace violence in emergency primary
- 52 health care : a focus group study. *BMC Fam Pract*. 2015;1–7.
- 53 54. Aydin B. Violence Against Practitioners in Turkey. 2009;1980–95.
- 54 55. The Royal Australian College of General Practitioners. *General practice – A safe place. A guide*
- 55

- 1
2
3 for the prevention and management of patient-initiated violence. [Internet]. 2015. Available
4 from: [http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-](http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-tipsandtools.pdf)
5 [tipsandtools.pdf](http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-tipsandtools.pdf)
6
7 56. WorkSafe Victoria. Prevention and management of violence and aggression in health services.
8 2017;(2).
9
10 57. Zhao S, Qu L, Liu H, Gao L, Jiao M, Liu J, et al. Coping with Workplace Violence against General
11 Practitioners and Nurses in Heilongjiang Province, China: Social Supports and Prevention
12 Strategies. *PLoS One*. 2016;11(6):1–14.
13
14 58. Magin P. General practice as a fortress. *Aust Fam Physician*. 2010;39(11).
15
16 59. Magin P, Adams J, Joy E. Occupational violence in general practice. *Aust Fam Physician*.
17 2007;36(11):955–7.
18
19 60. Calow N, Lewis A, Showen S, Hall N. Literature Synthesis: Patient Aggression Risk Assessment
20 Tools in the Emergency Department. *J Emerg Nurs* [Internet]. Emergency Nurses Association;
21 2016;42(1):19–24. Available from: <http://dx.doi.org/10.1016/j.jen.2015.01.023>
22
23 61. Kynoch K, Wu CJ, Chang AM. Interventions for preventing and managing aggressive patients
24 admitted to an acute hospital setting: A systematic review. *Worldviews Evidence-Based Nurs*.
25 2011;8(2):76–86.
26
27 62. Lipscomb JA, El Ghaziri M. Workplace Violence Prevention: Improving Front-Line Health-Care
28 Worker and Patient Safety. *NEW Solut A J Environ Occup Heal Policy* [Internet].
29 2013;23(2):297–313. Available from: <http://journals.sagepub.com/doi/10.2190/NS.23.2.f>
30
31 63. Wassell JT. Workplace violence intervention effectiveness: A systematic literature review. *Saf*
32 *Sci* [Internet]. Elsevier Ltd; 2009;47(8):1049–55. Available from:
33 <http://dx.doi.org/10.1016/j.ssci.2008.12.001>
34
35 64. Morphet J, Griffiths D, Beattie J, Velasquez Reyes D, Innes K. Prevention and management of
36 occupational violence and aggression in healthcare: A scoping review. *Collegian* [Internet].
37 Australian College of Nursing Ltd; 2018; Available from:
38 <https://doi.org/10.1016/j.colegn.2018.04.003>
39
40 65. Wax JR, Pinette MG, Cartin A. Workplace Violence in Health Care-It's Not "Part of the Job".
41 *Obstet Gynecol Surv* [Internet]. 2016;71(7):427–34. Available from:
42 <http://www.ncbi.nlm.nih.gov/pubmed/27436177>
43
44 66. Occupational Safety and Health Administration. Guidelines for Preventing Workplace Violence
45 for Healthcare and Social Service Workers. 2016;1–53. Available from:
46 <https://www.osha.gov/Publications/OSHA3148.pdf>
47
48 67. Wiskow C. Guidelines on Workplace Violence in the Health Sector, Comparison of major
49 known national guidelines and strategies. *Strategies*. 2003;
50
51 68. NICE. Violence and Aggression, Short-Term Management in Mental Health, Health and
52 Community Settings: Updated edition [Internet]. Violence and Aggression: Short-Term
53 Management in Mental Health, Health and Community Settings: Updated edition. 2015.
54 Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26180871>
55
56 69. FOD Binnenlandse Zaken, FOD Volksgezondheid. Veiligheid voor huisartsen. 2009; Available
57 from: <http://www.veiligheidvanartsen.be/>
58
59 70. Een veilige dokterspraktijk [Internet]. 2017. Available from:
60 <https://www.besafe.be/publicaties/een-veilige-dokterspraktijk>
71.
72. Daffern M, Day A, Cookson A. Implications for the prevention of aggressive behavior within
psychiatric hospitals drawn from interpersonal communication theory. *Int J Offender Ther*
Comp Criminol. 2012;56(3):401–19.
Landau SF, Bendalak J, Amitay G, Marcus O. Factors related to negative feelings experienced
by emergency department patients and accompanying persons: An Israeli study. *Isr J Health*
Policy Res. *Israel Journal of Health Policy Research*; 2018;7(1):1–9.

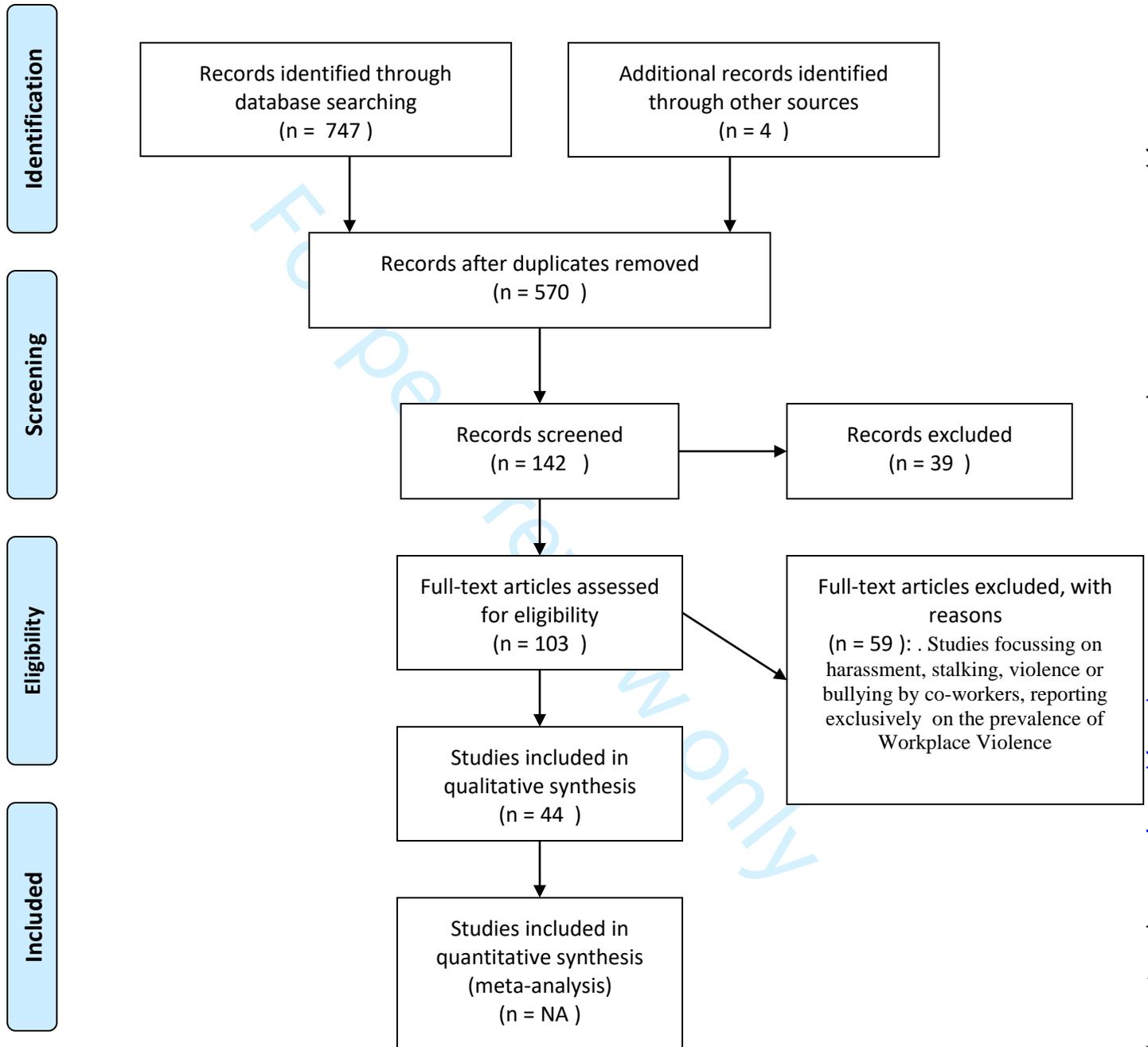
Figure 1: Prisma Flow diagram record screening and inclusion

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PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Supplementary Materials: Interventions to prevent aggression against doctors: A Systematic Review

Appendix 1

Details of search strategy						
I preliminary search 3-6 February 2018						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
1	pubmed 3 Feb. 2018	((("physician"[Title/Abstract] OR "general practitioner"[Title/Abstract]) OR "doctor"[Title/Abstract]) AND "aggression"[Title/Abstract])	153	44		
2	pubmed 3 Feb 2018	((("physician"[Title] OR "general practitioner"[Title]) OR "doctor"[Title]) AND "violence"[Title])	79	17		
3	embase 4 Feb 2018	'physician':ab,ti OR 'general practitioner':ab,ti) AND 'aggression':ab,ti	145			
4	embase 6 Feb 2018	Query'physician'/mj AND 'violence'/mj NOT 'domestic violence'/exp Mapped terms"domestic violence" mapped to 'domestic violence', term is exploded articles and review	68			
5	TRIP 4 Feb 2018	physician violence	261	2		
6	Cochrane 4 Feb 2018	"workplace" in Title, Abstract, Keywords and violence in Title, Abstract, Keywords in Other Reviews'	17	0	0	
7	ebmpractice 4 Feb 2018	geweld, agressie	1	1	1	
8	crd 4 Feb 2018	Results for: (violence):TI NOT (domestic):TI NOT (partner):TI IN DARE	23	3		
	<i>subtotal</i>		747	67	46	12
II Systematic Search						
	database / date	search strategy	hits	abstract screen	full text screen	studies selected
0	pubmed 15 Feb 2018	Search (((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND ("1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND prevent*[Title/Abstract] Sort by: Best Mat	53	24	8	4
1	pubmed 15 Feb 2018	((("Workplace Violence"[Mesh]) OR "Aggression"[Mesh]) AND "Health Care Sector"[Mesh])	8	8	3	3
2	pubmed 15 Feb 2018	((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (	19	10	6-3 double =3	0

		"1999/12/31"[PDat] : "2018/02/15"[PDat]))) AND intervert*[Title/Abstract]				
3	pubmed 15 Feb 2018	((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms]) AND physician[MeSH Terms])) NOT domestic violence[MeSH Terms]) AND (" 1999/12/31"[PDat] : "2018/02/15"[PDat]))))) AND strateg*[Title/Abstract])	34	8	8-6 double= 2	0
4	pubmed 15 Feb 2018	Search (((((((((((((aggression[MeSH Terms]) OR violence[MeSH Terms])) AND Review[ptyp] AND "last 10 years"[PDat])) NOT domestic violence[MeSH Terms]) AND Review[ptyp] AND "last 10 years"[PDat])) AND prevent*[Title/Abstract]) AND Review[ptyp] AND "last 10 years"[PDat])) AND Review[ptyp] AND "last 10 years"[PDat] AND Humans[Mesh])) NOT youth[MeSH Terms]) NOT abuse, partner[MeSH Terms] Sort by: Best Match Filters: Review; published in the last 10 years; Humans	272	24	14+ 4 snowball -3 double =15	12
5	pubmed 15 Feb 2018	Search (((("General Practitioners"[Mesh]) OR "General Practice"[Mesh]) AND "Violence"[Mesh])) NOT domestic violence[MeSH Terms] Sort by: Best Match Filters: Humans; English	158	46	13-2 double =11	6
6	psycharticle 14 Feb 2018	((ti(aggression) OR ti(violence)) NOT ti(partner) NOT ti(domestic)) AND ti(physician) OR ti(doctor) OR ti(workplace)	26	22	11	3
	extra				4	4
	<i>subtotal</i>		570	142	57	32
	Total				103	44



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	NA



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4-5 and appendix
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Tables
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Tables
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Tables 4-6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	9
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Page 2 of 2