

BMJ Open Interventions to prevent aggression against doctors: a systematic review

Ann Raveel,¹ Birgitte Schoenmakers^{1,2}

To cite: Raveel A, Schoenmakers B. Interventions to prevent aggression against doctors: a systematic review. *BMJ Open* 2019;**9**:e028465. doi:10.1136/bmjopen-2018-028465

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2018-028465>).

Received 09 December 2018

Revised 13 August 2019

Accepted 16 August 2019

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 Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Data sources Pubmed, Embase, Turning Research into Practice (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 focused 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 Grading of Recommendations, Assessment, Development and Evaluation (GRADE) and GRADE-Confidence in the Evidence from Reviews of Qualitative Research (CERQUAL).

Results 44 studies are included. One randomised controlled trial (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 psychiatric conditions. 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. Postincident reporting followed by root cause analysis of the incident provides the basic input for review and optimisation of violence prevention programmes.

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 numerical 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 with 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, focusing on violent incidence rates and on the why and how an intervention could work.
- The review failed to gather sufficient numerical data to perform a meta-analysis.

INTRODUCTION

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

A large, nationwide Australian study Balancing Employment and Life (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 had experienced verbal or written aggression and 32.3% had experienced physical aggression in the previous 12 months. The 12-month prevalence of aggression towards general practitioners (GPs) was 54.9% for verbal aggression and 23.4% for physical aggression.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 GPs showed that only about 5% never encountered aggression. In most cases, the aggression was verbal, 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 had faced



© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Public Health and Primary Care, KU Leuven, Leuven, Belgium

²Public Health and Primary Care, University Leuven, Leuven, Belgium

Correspondence to

Birgitte Schoenmakers;
birgitte.schoenmakers@kuleuven.be

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 (EDs) 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 ED of which 44% was associated with drug and alcohol exposure.⁵ More than a quarter of emergency physicians reported that they were victims of physical assault in the past year.⁶ A large randomised controlled trial (RCT) in a hospital setting identified between 8 and 15 reported violence events per 100 full-time equivalent staff members per year.⁷

In the healthcare 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 workplace violence can lead to physical and psychological injury, reduced job satisfaction and detachment, and affect the quality of care.

Although the impact of workplace-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 Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.⁸ The risk of bias for randomised controlled studies 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 focused on prevention of type II workplace violence: verbal, physical and psychological aggression from a patient or a patient's relative towards a healthcare worker. Studies focusing 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 healthcare workers in general healthcare, psychiatric departments, EDs, emergency primary care, general practice. Eligible interventions were focusing on risk factors, workplace violence prevention or strategies to reduce workplace violence. Comparison was defined as usual care and as strategy in case of reporting of a hazardous situation.

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

Search strategy

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

Data collection and analysis

The selected intervention studies were grouped into two groups: quantitative and qualitative studies. 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 Quantitative studies were rated according to GRADE.^{11 12} For qualitative studies the GRADE-CERQUAL approach was used to assess quality.¹³

Patient and public involvement

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

RESULTS

The total harvest of articles is presented in (online supplementary appendix 1). In total 105 full-text articles were read and assessed for eligibility. Forty-four studies (15 quantitative studies, 15 qualitative studies, 7 systematic reviews and 7 reviews) were included in this review (figure 1).

Summary of results

The results of the quantitative studies are presented in table 1, the results of the qualitative studies in table 2. Table 3 summarises the systematic reviews and other reviews. Table 4 gives an overview of frequently cited guidelines. Table 5 summarises the factors that may increase the risk of workplace violence.

Studies reporting on interventions

The interventions most frequently discussed and evaluated are grouped. The first group of interventions was labelled as pre-event preventive measures: components of an integrated violence prevention programme. The second group was labelled as interventions taking place during a violent event: applying de-escalation techniques and activating specific violence emergency procedures.



PRISMA 2009 Flow Diagram

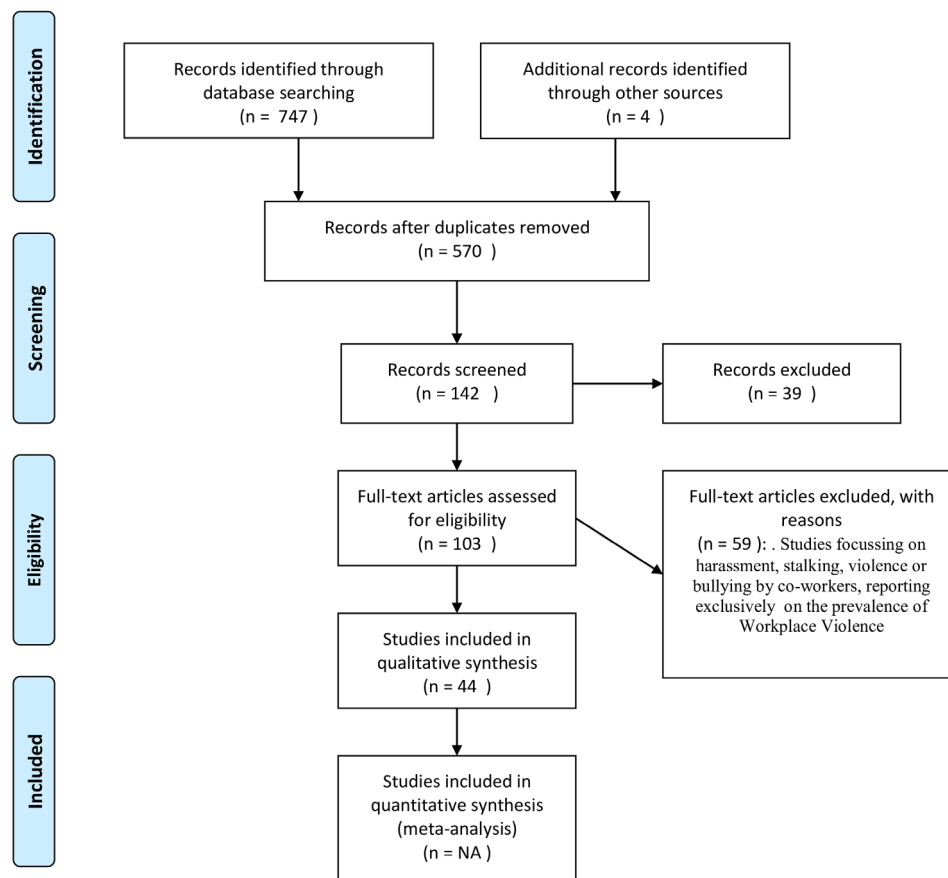


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of record screening and inclusion (adapted from Moher *et al* [8]).

The third group was labelled as postincident interventions: incident reporting followed by root cause analysis of the incident and review of the violence prevention policy.

Pre-event preventive measures

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

Violence prevention programmes

A variety of violence prevention programmes has been developed in order to prevent workplace violence and to manage and mitigate the impact of violence at work. All programmes 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 programmes 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 seven US

hospitals over a period of 5 years.⁷ The study provided moderate evidence of this approach in decreasing risks of patient-to-worker violence and related injury at 6 months postintervention: the incident rate ratio (IRR) of violent events was significantly lower in intervention units compared with control units (IRR 0.48, 95% CI 0.29 to 0.80). However, this effect was not confirmed over time during the 24-month follow-up period. At that time, only violence-related injury was lower in intervention units compared with control units (IRR 0.37, 95% CI 0.17 to 0.83). Lipscomb *et al* evaluated in a 4-year study the impact of the implementation of the Occupational Safety and Health Administration (OSHA) guidelines and compared three intervention groups with three control groups in mental health facilities.¹⁴ Both the intervention and the control groups implemented safety preventions but the control group did not benefit from the additional support of the project team on violence prevention. The staff reported in both groups significant improvements in OSHA elements: management commitment, employee involvement and hazard assessment, and hazard control activities. Intervention facilities also reported significant

Table 1 Summary of selected quantitative studies

Reference	Setting	Level/ grade	Study design	Intervention	Outcome	Results (grade)
Arnetz <i>et al</i> ⁷	USA, 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 violence-related injuries Intervention group compared with control group Evolution over time compared with baseline 	<p>Rates of violent events:</p> <ul style="list-style-type: none"> Six months postintervention, incident rate ratio (IRR) of violent events was significantly lower on intervention units compared with control IRR 0.48 (95% CI 0.29 to 0.80) Rates of violence decreased slightly but not significantly in the intervention group compared with baseline and increased significantly in the control group compared with baseline. Significantly increased violent event rates at 24 months compared with baseline in both groups: intervention group from 8 to 13.8 per 100 FTE and control group from 8 to 15.4 per 100 FTE. <p>Violence-related injuries:</p> <ul style="list-style-type: none"> 24 months postintervention, the violence-related injury was lower on intervention units compared with control IRR 0.37 (95% CI 0.17 to 0.83). <p>Remark: results were not consistent over time during the 24-month follow-up period.</p>
Abderhalden <i>et al</i> ²⁸	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 the BRSet Violence Checklist, 2 times per day during the first 3 days In case of high risk (1 in 10 patients will physically attack during next shift): discuss possible prevention measures from the 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 vs control 15%, p<0.001. Significant reduction in attacks: 41% vs 7%, p<0.001. Significant reduced need for coercive measures: 27% reduction in intervention group vs 10% increase in control, p<0.001. 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.
JE Arnetz and BB Arnetz ²²	47 healthcare workplaces 1500 nurses in EDs, geriatric, psychiatric, home healthcare, Sweden, ED, Psy, GER	Level 3 Low	RCT Implementation and evaluation of a practical intervention programme for dealing with violence towards healthcare workers	<ul style="list-style-type: none"> Form of violent incidents in the intervention and control groups Structured feedback programme in the 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 the intervention group compared with the control group (low).
Lipscomb <i>et al</i> ¹⁴	Mental health facilities, 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 Three intervention groups, three comparison groups Baseline and postintervention survey 4 years study 	<ol style="list-style-type: none"> OSHA guidelines serve as framework/Management commitment to the violence prevention programme Employee involvement in VPP Hazard assessment activities Hazard control activities: infrastructural, organisational, environmental, administrative, behavioural Training 	<ul style="list-style-type: none"> Staff perception of quality of programme elements Frequency of reported threats and physical assaults in intervention and comparison facility preintervention and postintervention 	<ul style="list-style-type: none"> Staff in both intervention and comparison groups reported significant improvements in the first four 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 the intervention group nor in the comparison group. Significant increase in threats of assault in the intervention group (+88%, p<0.001), a non-significant increase in the comparison group (+7%, p=0.08). Remark: both the intervention and the comparison groups did implement safety preventions but the comparison groups did not benefit from the support of the team resources of the worksite violence study.

Continued

Table 1 Continued

Reference	Setting	Level/grade	Study design	Intervention	Outcome	Results (grade)
Magnavita ³⁶	Small-scale psychiatric unit, Italy, about 85 workers	Level 3 Low	► Preintervention and postintervention comparison test	<ul style="list-style-type: none"> ► Aggression minimisation programme as part of total quality management ► Architecture and work organisation: Rearrangement of building three assistance areas depending on severity of mental illness ► Increased nurse-to-patient ratios, staff coverage ► Remove patients from monitoring tasks ► Improved lighting ► Safety alarms ► Education 	<ul style="list-style-type: none"> ► Violence incident form ► Assault rate: preintervention and postintervention ► Assault rate for aggression using physical force ► Verbal abuse, and so on, not addressed 	<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
Kling	Acute care hospital, Canada, 109 cases	Level 3, Low	Preintervention and postintervention study evaluation of the violent risk assessment system and retrospective case control	<ul style="list-style-type: none"> ► 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"> ► Violent incidence risk ► Adjusted OR for violence in flagged patients 	<ul style="list-style-type: none"> ► During intervention compared with preintervention ► RR hospital: 0.57 (0.33–1.83) (not significant) ► RR direct patient care workers: 0.52 during intervention (0.33 to 0.81) ► RR high-risk department: 0.39 (0.24 to 0.61) ► Postintervention compared with preintervention ► RR hospital 1.01 (0.989 to 1.04) ► RR direct patient care workers 1.03 (1.00 to 1.06) ► RR high risk department: 1.04 (1.01 to 1.07) ► In contrast to hypothesis: ► Adjusted OR for violent incident 6.28 for patients flagged by the alert system.
Mohr et al, ¹⁵	138 veterans healthcare facilities	Level 3 Low	<ul style="list-style-type: none"> ► Longitudinal study ► Impact of implementation of a workplace violence programme on rates of workplace violence over a period of 6 years: 2004–2009 ► Relationship of assault rates with workplace violence dimension score ► Percentage change in assault rates in 2009 compared with 2004 	<ul style="list-style-type: none"> ► Implementation of a workplace violence prevention programme ► Workplace violence prevention dimension score 	<ul style="list-style-type: none"> ► 43 workplace violence prevention items, grouped into three dimensions: training, workplace practices, environmental control and security ► Standardised 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: ► Large differences in facilities in assault rate reduction or increase ► Under-reporting prior to the workplace violence prevention programme ► Reduction in severity of assaults (workers compensation claims declined 40% between 2001 and 2008).
Hvidhjelm et al 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 BrOset Violence Checklist ► 156 patients, checked three times per day during 24 months 	<ul style="list-style-type: none"> ► BVC six items checklist as predictor of short-term (<24 h) risk of violence ► Score six 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 	<ul style="list-style-type: none"> ► BVC showed overall satisfactory specificity and sensitivity as a predictor of short-term risk of violence, (low) score ≥ 3: ► Sensitivity: 65.6% ► Specificity 99.7% with overall risk 0.3%; ► PPV score ≥ 1: 17.5%. ► PPV score ≥ 3: 37%. ► NPV score < 3: 99.9%.
Partridge and Affleck ⁴⁵	ED, 2046 patients, Australia	Level 3 Low	<ul style="list-style-type: none"> ► Population-based observational study ► Statistical utility of the BrOset Violence Checklist by a security officer in the ED 	<ul style="list-style-type: none"> ► Predicting aggressive patient behaviour using the BrOset Violence Checklist by security officers in ED 	<ul style="list-style-type: none"> ► Short-term risk of violence 	<ul style="list-style-type: none"> ► BVC showed a good sensitivity, specificity and predictive value of short-term risk of violence, (low), overall risk 1.7% ► Score ≥ 1: PPV 16.7%, LR +11.6, sensitivity 88.6%, specificity 92.4%. ► Score ≥ 2: PPV 34.2%, LR +30.3, sensitivity 65.7%, specificity 97.8%. ► Score ≥ 3: PPV 55.2%, LR +71.4, sensitivity 45.7%, specificity 99.4%.

Continued

Table 1 Continued

Reference	Setting	Level/ grade	Study design	Intervention	Outcome	Results (grade)
Morken and Johansen ²⁴	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 set-up: 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 (64%), portable alarm (28%), CCTV camera (28%), and so on.Training (40%).Reporting: monitor and follow-up of violence episodes (75%).No reporting of number of violent incidents.98% response rate.No results on effectiveness.Application of measures give indication on perceived usefulness of recommendations and feasibility of recommendations.	<ul style="list-style-type: none">Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (very low).Training should be seen as a valuable initial step in developing aggression-related requirements.	
Nau <i>et al</i> ⁴⁶	63 nursing students attending training course, Germany	Level 5 Very low	Longitudinal pretest and post-test study The development and testing of a training course in aggression for nursing students	<ul style="list-style-type: none">3 days training course	<ul style="list-style-type: none">Confidence in coping with patient aggression10-item scaleNo results on actual performance in healthcare settings	<ul style="list-style-type: none">Enhanced self- confidence score in managing aggression from 2.5 to 3.6 (very low).Training should be seen as a valuable initial step in developing aggression-related requirements.
Schat and Kelloway ⁴⁵	Healthcare setting 225 employees in healthcare	Level 5 Very Low	Organisational support: reducing adverse consequences of workplace aggression Survey, moderated multiple regression	Secondary prevention: moderating effect of organisational support: instrumental support (eg, support from co-workers) and informational support (eg, training) on negative consequences of workplace aggression and violence	<ul style="list-style-type: none">Fear of future violenceEmotional well-beingSomatic health scaleJob-related affectJob neglect	<ul style="list-style-type: none">Instrumental support: positive effect on variance of (3%–6%) : emotional well-being, somatic health, job-related effect. 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.
Ifediora ²³	General practice, Australia, 300 doctors of National Home Doctors Service after-hours house call services	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 incidents of violence.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-hours house calls.Use of chaparones/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: 15%.Panic buttons: 7%.Personal alarms: 6%.		
Hills and Joyce ⁴⁷	Australia, clinical medical practice, 9449 doctors of which 3515 GPs	Not applicable	Cross-sectional study, self report survey of implementation of 12 prevention and minimisation actions MABEL Survey	<ul style="list-style-type: none">No report on effectivity of measures.Implementation of recommendations:<ul style="list-style-type: none">Policies, protocols for aggression prevention and management: 66%.Warning signs in reception: 49%.Alerts to high risks of aggression: 52%.Restricting or withdrawing access to services for aggressive persons: 45%.Incident reporting and follow-up: 68%.Education & training: 53%.Alarms : 47%.Clinician escape: 23%.Optimised lighting, noise level, comfort and waiting time in waiting area: 52%.Patient access restriction: 62%.Building security system: alarm, camera, and so on: 70%.Safety measures for after-hours on-call work or home visits: 34%.		
Geoffrion <i>et al</i> ²³	1141 healthcare workers and law enforcers, Canada, GEN	Not applicable	Survey: individual and organisational predictors of trivialisation 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 under-reporting.Individual factors in healthcare:<ul style="list-style-type: none">Men are more likely than women to consider workplace violence as part of the job (34% vs 23%) and perceived a taboo (54% vs 42%).Staff with more than 15 years of work experience are more likely to tolerate workplace violence as part of the job.Organisational factors: colleague and employer support, training, zero tolerance policy contribute to normalisation of violence but decrease the likelihood of taboo.	

ED, emergency department; GP, general practitioner; RCT, randomised controlled trial.

Table 2 Summary of selected qualitative studies GRADE-CERQual assessment

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie <i>et al</i> ⁴⁸	3 EDs USA 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"> Workplace violence policies and procedures: for example, risk assessment, record-keeping, response to violent events Workplace violence education Environmental changes: for example, panic buttons, lock doors, cameras 	<ul style="list-style-type: none"> Impact on violence rates was not reported. Programme fidelity: variable success in institutionalising and sustaining intervention subcomponents. Mixed overall evaluation of the programme by employees: Employees rated the programme as moderately beneficial. Surveillance and monitoring environmental changes, education and postincident care were rated as very important. Policies and procedures were rated as important. Managers and educators programme evaluation: Most important components were: surveillance, environmental changes, classroom training and postincident care. Workplace violence 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 ¹⁷	EDs Situational crime prevention in EDs	Medium	Preventing interpersonal violence in EDs: practical applications of criminology theory	<ul style="list-style-type: none"> Increase the effort of criminal activity: for example, secure entrances/exits, metal detectors Increase the risks of getting caught: for example, install CCTV cameras Reduce the rewards of criminal activity: for example, reduce the amount of prescription drugs carried by staff Reduce provocations: for example, appropriate waiting areas, secure and isolate volatile patients Remove excuses for disruptive and violent behaviour: for example, clearly post rules of conduct and consequences for breaking them, streamline the check-in process form, refuse admission to intoxicated visitors 	<ul style="list-style-type: none"> In many EDs these interventions are partially implemented based on the risk assessment and prevention rationale. A systematic test of the proposed prevention techniques is not performed. Remark: Situational crime theory is based on rational choice, however, violence in healthcare is mostly impulsive and unplanned. To deny access to ED if the patient is drunk or intoxicated, is in conflict with the patient's fundamental right to healthcare and the physician's duty of care.
Holloman <i>et al</i> ⁴⁹	Emergency Psychiatry Psy	Medium	Overview of Project BETA: Best Practices in Evaluation and Treatment of Agitation: to develop guidelines including all interventional aspects: triage, diagnosis, verbal de-escalation and medicine choices	<ul style="list-style-type: none"> Five study workgroups Medical evaluation and triage of the agitated patient. Psychiatric evaluation of the agitated patient. Verbal de-escalation of the agitated patient. Psychopharmacological approaches to agitation. Use and avoidance of seclusion and restraint. 	
Stowell <i>et al</i> ⁶⁰	Emergency Psychiatry	Medium	BETA project Psychiatric evaluation of the agitated patient	<ul style="list-style-type: none"> Prior to attempting de-escalation, a brief evaluation must be aimed at determining the most likely cause of agitation: Has the patient an acute medical problem ? Has the patient a delirium ? Has the patient a chronic cognitive impairment that is contributing to the current state of agitation ? Is the patient intoxicated (patient withdrawal)? Is the patient's agitation due to psychosis caused by a known psychiatric disorder? Is the agitation due to non-psychotic depression or anxiety disorder? Is the patient simply angry or out of control ? Assess the risk of suicide and violence. 	

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Richmond <i>et al</i> ³¹	Emergency Psychiatry	Medium	BETA project Verbal de-escalation of the agitated patient	<p>The authors detail the proper foundations for appropriate training for de-escalation using the 10 domains of de-escalation:</p> <ul style="list-style-type: none">▶ Respect the patient and your personal space: maintain at least two arms' length of distance.▶ Do not be provocative: avoid iatrogenic escalation. Body language and tone of voice should be congruent with what the clinician is saying.▶ Establish verbal contact: Only one 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.▶ Be concise and keep it simple, use short sentences, give the patient time to process and respond.▶ 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.▶ 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 judgemental and the patient will sense that you are interested in what he is saying and this will improve your relationship.▶ Agree with the patient as much as possible or agree to disagree.▶ 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.▶ 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.▶ Debrief the patient and staff.³¹	
Wilson <i>et al</i> ⁵¹	Emergency Psychiatry	Medium	Psychopharmacology of agitation BETA project	<ul style="list-style-type: none">▶ 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.▶ Oral medications should be offered over intramuscular injections if the patient is cooperative and no medical contraindications to their use exist.▶ Antipsychotics are indicated as first-line management of acute agitation with psychosis of psychiatric origin.▶ 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.▶ 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.⁵¹	
Price and Baker ²⁶	Process of de-escalating violence and aggression excluding patients with dementia	High	Key components of de-escalation techniques Qualitative research Thematic synthesis	<p>Seven themes</p> <p>Staff skills:</p> <ul style="list-style-type: none">▶ Characteristics of effective de-escalators: open, honest, supportive, self-aware, coherent, non-judgmental and confident without being arrogant.▶ 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 or that they have gained the upper hand.▶ Verbal and non-verbal skills: calm, gentle, soft tone of voice. <p>Process of intervening:</p> <ul style="list-style-type: none">▶ Engaging with the patient: establish a bond.▶ When to intervene.▶ Ensuring safe conditions for de-escalations.▶ Strategies for de-escalation autonomy confirming interventions:<ul style="list-style-type: none">Shared problem solvingFacilitating expressionOffering alternatives to aggression limit setting and authoritative interventions: knowing when to exert control and implement.²⁶	

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Morken <i>et al</i> ⁶²	Emergency Primary Healthcare, Norway, 15 nurses and 22 physicians	Medium	Focus group study, qualitative design Dealing with workplace violence in emergency primary care focusing on organisational factors.	Organisational strategies for workplace violence prevention: <ul style="list-style-type: none"> ▲ Minimising the risk of working alone: Having an efficient alarm system with adequate response time to summon someone. ▲ Regular turning up of colleague. Being prepared: obtain information prior to the consultation, take precautions when facing warning signs, alerting colleagues or police in advance. ▲ Resolving mismatch between patient expectations and services offered: for example, clear and consistent procedures on not handing out drugs to patient and communicate these to the public. ▲ Supportive manager response in follow-up of a violent episode. 	
Moylan, 2017	General practice, Australia	Not applicable	Discussion on practical measures to manage the risk of occupational violence based on guidelines from RACGP and WorkSafe Victoria.	Multilevel response: workplace design. policies and work practices. training. Before consultation: Is there a quick exit route? Do you have an alarm mechanism or call for assistance? Are there patient flags for previous violence? Are there other client risk factors present? Is a chaperone required? During consultation: Are warning signs of violence present ? De escalate versus end consultation ? After the consultation: Has the patient left safely ? Are others in practice safe ? Documentation of event ?	
Elston and Gabe ²	General practice 1300 GPs 13 focus groups 19 in-depth interviews English National Health Service UK	Medium	Survey, in-depth interviews, focus group discussions Gender differences in risk of violence and prevention measures	<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. ▲ 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: GPs strongly opposed to so-called 'fortress medicine'. 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. 	

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Sim <i>et al</i> ²²	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: Staff: friendly, patient-focused approach, demonstrating willingness can reduce stimuli for aggressive behaviour. System approach to reduce long waiting times: for example, include emergency appointment slots, courtesy message systems to alert patients about delays, rescheduling late patients... ► Management of aggression: Recognizing aggressive behaviour. De-escalating early aggression. Limit setting and follow-up of incidents. Use of verbal or written behaviour contracts. Systems approach by applying the Plan-Do-Check-Act approach. Establish a roadmap to follow when faced with aggressive behaviour. 	
Magin ⁵³	General practice, Australia practice receptionists	Medium	Semistructured interviews Experiences and perceptions of GP receptionists with Perspex and lockdown system	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. ► Respondents from low prevalence practices did not see the need for these measures.
Magint <i>et al</i> ¹⁸	General practice, Australia GP	Medium	Focus group discussions (18 GPs) 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 antagonise therapeutic relationships with mutual suspicion and misunderstanding spiralling into violence. 	
Magin <i>et al</i> ⁵⁴	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-hours 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 <i>et al</i> ³⁴	General practice London	Medium	30 interviews and 5 focus groups (44 people)	<p>Strategies for incident management and team organisation:</p> <ul style="list-style-type: none"> ► Immediate response: Containment and cooperation. Aimed at managing immediate incident, preventing escalation and preserving patient-staff relationship. ► Medium-term strategies: 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: 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. 	

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Kowalenko <i>et al</i> ⁶	ED USA Physical assault	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 OSHA. ► No evidence-based policies and interventions.
Garriaga <i>et al</i> ³⁰	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	<p>22 recommendations:</p> <ul style="list-style-type: none"> ► Identify possible medical cause. ► First choice: verbal de-escalation and environmental modification. ► Physical restraint: last resort. <ol style="list-style-type: none"> 1. Pharmacological treatment: calm without oversedation. 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. 7. In front of risk of violence, the safety of patient, staff and others patients should be presumed. 8. If restraint and seclusion are necessary, proper monitoring and 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 hours or until awake. 10. Physical restraint should be removed as soon as the patient is assessed 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 involved as much as possible 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 oversedation. 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 the intramuscular route in mildly agitated patients. 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. 22. Elderly agitated patients should be treated with lower doses: usually between a quarter and a half of the standard adult dose.³⁰ 	

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Wright <i>et al</i> ¹⁹	General practice, UK	Medium	Systematic Review Prevalence and management of violence in primary care	<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 grills, 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'.¹⁹ 	<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.
Phillips ²⁰	Healthcare different settings, USA	Medium	Review article Prevalence of type II workplace violence. Non-hospital setting. Hospital setting. Barriers to reporting. Risk factors. Metal detectors. Guidelines. Potential solutions.	<ul style="list-style-type: none"> Although metal detectors may theoretically mitigate violence in the healthcare 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. A multifaceted, multidisciplinary approach is necessary and any prevention programme requires individualisation and customisation. Recommendations that have been proposed: <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. Healthcare organisations: 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': criminal justice theory that apathy towards low-level crimes creates a neighbourhood conducive to more serious crime also applies to workplace violence. 'Zero tolerance policy' may prevent escalation.²⁰ 	<ul style="list-style-type: none"> Although metal detectors may theoretically mitigate violence in the healthcare 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. A multifaceted, multidisciplinary approach is necessary and any prevention programme requires individualisation and customisation. Recommendations that have been proposed: <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. Healthcare organisations: 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': criminal justice theory that apathy towards low-level crimes creates a neighbourhood conducive to more serious crime also applies to workplace violence. 'Zero tolerance policy' may prevent escalation.²⁰
Wax <i>et al</i> ⁵⁶	Healthcare USA	Not applicable	Review Workplace Violence in Healthcare: It's Not 'Part of the Job'.	<ul style="list-style-type: none"> Prevalence: healthcare workers comprise only 13% of the US workforce but experience 60% of all workplace assaults. Types of workplace violence. Contributors to workplace violence: see discussion on risk factors. Consequences of workplace violence in healthcare. Guideline summary: OSHA.⁵⁷ Responding to active shooter incident: 'run, hide, fight' approach. The human, societal and economic costs of healthcare workplace violence are enormous and unacceptable. There are opportunities for professional physician organisations to establish clear policy statements on workplace violence, to support education on workplace violence and to assist collaborative state legislative efforts. 	<ul style="list-style-type: none"> Prevalence: healthcare workers comprise only 13% of the US workforce but experience 60% of all workplace assaults. Types of workplace violence. Contributors to workplace violence: see discussion on risk factors. Consequences of workplace violence in healthcare. Guideline summary: OSHA.⁵⁷ Responding to active shooter incident: 'run, hide, fight' approach. The human, societal and economic costs of healthcare workplace violence are enormous and unacceptable. There are opportunities for professional physician organisations to establish clear policy statements on workplace violence, to support education on workplace violence and to assist collaborative state legislative efforts.

Continued

Table 2 Continued

Reference	Setting	CERQual	Study design	Intervention	Key findings with respect to review question
Gillespie <i>et al</i> ²¹	Healthcare workers USA	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. ▲ Organisational policies, zero-tolerance policy. ▲ After a 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 healthcare 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. ▲ Violence-prevention training on hiring and regular updates; including recognising stress in oneself or in patients, de-escalation techniques. ▲ Effective violence-prevention programme. ▲ Limiting visitor access to two persons. 	<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. ▲ Organisational policies, zero-tolerance policy. ▲ After a 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 healthcare 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. ▲ Violence-prevention training on hiring and regular updates; including recognising stress in oneself or in patients, de-escalation techniques. ▲ Effective violence-prevention programme. ▲ Limiting visitor access to two persons.
Robson <i>et al</i> ³⁷	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"> ▲ See discussion. ▲ Relatively small quantity of published peer-reviewed evidence involving occupational health and safety management 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 management system interventions, the evidence is insufficient to make recommendations either in favour or against. 	<ul style="list-style-type: none"> ▲ See discussion. ▲ Relatively small quantity of published peer-reviewed evidence involving occupational health and safety management 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 management system interventions, the evidence is insufficient to make recommendations either in favour or against.

ED, emergency department; GP, general practitioner; OSHA, Occupational Safety and Health Administration.

improvement in the training element. There was no significant reduction in physical assaults in the intervention and the control groups. There was a significant increase in threats in the intervention group (+98%, $p<0.001$). The authors attribute this unexpected finding to an increased tendency to report less severe events.

Mohr et al investigated in a longitudinal study in 138 veteran healthcare facilities the impact of the implementation of a workplace violence prevention programme.¹⁵ Overall, there was no significant change in assault rates over time. Training led to a significant but moderate 5% reduction in standardised incidence rate. The authors argue that the large variation across the facilities and the under-reporting prior to the workplace violence prevention programme explain the results. *Magnavita et al* studied the effect of an aggression minimisation programme in a small-scale psychiatric unit in Italy. The interventions included changes in architecture and work organisation and training of employees. A stable and significant reduction in assault rate per employee from 0.24 to 0.04 per year was reported.¹⁶

Risk assessment and risk control measures

Violence risk assessment and violence management are intrinsically connected. The risk factors can be categorised based on their source of origin: workplace design, work organisation, 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 psychiatric condition (table 5).

Subsequent to the specific violence risk assessment, the next step is applying appropriate risk control measures. 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.¹⁷

The proposed changes to physical environment vary across the different healthcare settings and include effective indoor and outdoor lighting, sufficient exit routes, physical barriers for receptionists, automatic door locks, video cameras, panic buttons, portable alarms and comfortable waiting areas to reduce stress. No concrete evidence exists on the effectiveness of these interventions.^{6 18–21} In some emergency departments in USA, metal detectors have been installed, and although they may theoretically mitigate violence, there is no concrete evidence to support this assumption.⁶

Adequate work policies include 'zero tolerance' policies, incident reporting, training of staff, adequate staffing, policies on drug prescription and storage, a roadmap when faced with aggressive behaviour and additional measures for out-of-hours services. Drugs, cash and prescriptions should be stored in locked places and in limited amounts. Long waiting times should be

Table 3 Summary of reviews and systematic reviews

Reference	Setting	Level/ grade	Study design	Intervention	Outcome	Results (grade)
Calow <i>et al</i> ⁵⁹	ED Nursing ED Psychinpatient setting	Level 3 Low	Review: Evaluation of the use of risk assessment tools in the ED 13 articles included No studies with RCT design	<ul style="list-style-type: none"> ► Use of risk assessment tools in ED. ► Does the use of an aggression risk assessment tool reduce the future risk of violence towards the healthcare worker? ► STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing. ► BVC: BrOset Violence Checklist inpatient setting, psychiatric units: 6-item tool confusion, irritability, bolsterousness, 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 the ED setting (moderate). ► BVC is the most prevalent tool in the inpatient setting and shows best validity and reliability. (moderate). ► There was no reporting on reduction of violence.
Kynoch <i>et al</i> ⁵⁹	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).
Lipscomb and Ghazir ⁶⁰	Front-line healthcare worker nursing USA	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: for example, web-based NIOSH training ► Workplace violence prevention programme 	<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 healthcare (moderate). ► Training is necessary but there is little evidence on impact. ► Complex and mixed findings on effect of workplace violence prevention programmes.
Runyan <i>et al</i> ⁵⁹	Medical Healthcare	Level 3 Low	Systematic review <ul style="list-style-type: none"> ► Studies included were mainly pretest and post-test study design ► No studies with RCT design 	<ul style="list-style-type: none"> ► Behavioural interventions ► Administrative interventions 	<ul style="list-style-type: none"> ► 41 papers: Sensible Recommended interventions but no hard data. ► Nine 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: 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. ► Psychiatric setting: training in aggression control technique: likelihood of assault 3% vs 37% in non-trained, but potential bias associated with decision to be trained (low). ► No significant differences in assault-related injuries between the trained and untrained groups (low). ► Psychiatric setting: no significant difference in number of injuries reported from pretest and post-test 4-day training (low). ► Flagging patients with repeated history of violent events. 96% reduction in assault by high-risk patients in veterans administration hospital (moderate). ► Quality management approach: improvements in inpatient violence: for example, 40% reduction in mealtime incidents after changes in lunchroom procedures (low).

Continued

Table 3 Continued

Reference	Setting	Level/ grade	Study design	Intervention	Outcome	Results (grade)
Price <i>et al</i> ²⁵	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. 23 uncontrolled cohort studies. 12 controlled cohort studies: three case control studies: No studies with RCT design	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 of 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. <p>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.</p> <ul style="list-style-type: none"> ▲ 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 tranquillisation (low), no effect on supply of extra medication (low). ▲ Organisational: reduction in lost workdays: ES 1.47 (moderate).
Wassell ⁶¹	GEN Retail industry	Level 3 Low	Systematic review Workplace violence intervention effectiveness	<ul style="list-style-type: none"> ▲ Interventions in the healthcare and retail industry 		<p>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.</p>
Morphet <i>et al</i> ⁶²	GEN		<ul style="list-style-type: none"> ▲ Scoping review ▲ Prevention and management of occupational violence and aggression in healthcare 	<ul style="list-style-type: none"> ▲ Environmental risk management ▲ Consumer risk assessment ▲ Staff education 	<ul style="list-style-type: none"> ▲ 20 selected articles 	<p>More in-depth reporting of the relevant underlying studies is provided in the current systematic review.</p>

ED, emergency department; RCT, randomised controlled trial.

Table 4 Overview of relevant guidelines

Guidelines		Country
Occupational Safety and Health Administration, 2016 ⁵⁷	Guidelines for preventing workplace violence for healthcare and social service workers	USA
Wiskow, 2003 ⁶³	Guidelines on workplace violence in the 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 ⁶⁴	Prevention and management of violence and aggression in health services	Australia
NICE, 2015 ⁶⁵	Violence and aggression: short-term management in mental health, health and community settings ⁶⁵	UK
FOD Binnenlandse Zaken and FOD Volksgezondheid, 2009 ⁶⁶	een veilige dokterspraktijk	Belgium
Een veilige dokterspraktijk, 2017 ⁶⁷	Veiligheid voor huisartsen, toolbox 1	

managed by expanding the staff during busy periods and by setting up courtesy message systems to alert patients about delay.^{20 22} Some guidelines and studies propose a ‘zero tolerance policy’ with explicit statements and warning signs stating that violence will not be tolerated. It is important to recognise verbal assault as a form of workplace violence since it is a risk factor for physical violence.²⁰ Some authors advise to restrict or withdraw access to general practice or emergency department services for patients with a history of violence.¹⁷ However, this also might compromise the ‘equality of access to care’ principle and there is no evidence of the impact on violence reduction. GPs should take additional measures for after-hours house call services such as using a central dispatch centre or a shared visit schedule and tracking system. Additional support might be provided in certain circumstances or on request of the GP.

Ifediora *et al* investigated the implementation of safety measures by GPs on after-hours call services in Australia: overall 43% of the doctors adopted protection measures and for after-hours house calls, 34% used additional chaperones or security personnel. The study did not investigate the impact of these measures on violence incidents.²³ Morken *et al* investigated in a cross-sectional study the implementation of 22 safety recommendations in 210 emergency primary care centres in Norway. The study provided evidence on the perceived usefulness and feasibility of the recommendations.²⁴

Training of staff in communication skills, violence and de-escalation techniques should be included in a comprehensive violence prevention programme. Effective training on de-escalation should focus on cognitive, affective and practical skills based improvements in behaviour and reaction in case of an assault. Self-awareness and the ability to connect interpersonally with the aggressor are crucial. Price *et al* investigated in a systematic review, the cognitive and affective outcome and the effectiveness of training on violence. There is currently limited evidence

that this training has an effect on de-escalation of aggressive behaviour.²⁵ As discussed hereafter, de-escalation is a highly specialised intervention and this might explain the limited effectiveness of the training programmes.²⁶

With respect to patient risk factors, the risk of violence is dynamic and contextual.²⁷ Violence in medical health-care is mostly impulsive and accompanied by the fight-flight response although premeditated aggression also occurs. Risk assessment tools focusing on patient aggression have shown to be effective as a predictor for short-term violence. Abderhalden *et al* investigated in an RCT the use of short-term risk assessment in 14 acute psychiatric wards in Switzerland. The intervention consisted of structured risk assessment twice a day followed by communication of risk scores and recommendation for actions tailored to the risk level. The study showed a significant reduction in severe events of patient aggression, a significant reduction in attacks and a significantly reduced need for coercive measures.²⁸ Flagging patients with a history of violent events resulted in 90% reduction in assaults by high-risk patients in veteran healthcare hospitals in USA.²⁹

Interventions during the 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, in the medical care sector and 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.³⁰ After identification of possible medical

Table 5 Risk factors that increase the risk of occupational violence ^{4 18–22 30 33 52 54 56 60 68–71}

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 aetiology and treatment of various pathologies associated with violent behaviour ▶ Use of physical restraints ▶ Mismatch between expectations and services offered: for example, 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: Hyponatraemia, hypocalcaemia, hypoglycaemia 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 ▶ Unexpected or high costs of healthcare ▶ 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: for example, 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, for example, 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

GP, general practitioner.

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 5min. Non-coercive de-escalation

is executed in a three-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.³¹ 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.²⁶

Similar principles of de-escalation have also been described by Kohlrieser, a psychologist and hostage negotiator.³²

Postincident measures

As studied by Geoffrion *et al* individual and organisational factors can lead to trivialisation of workplace violence, a culture of silence and under-reporting of workplace violence. Two aspects play a role in trivialisation 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.³³

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 workplace violence policy.³⁴

Organisations should provide support and assistance to victims and address short-term 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 well-being, somatic health and job-related affect but there was no effect on fear of future violence and on job neglect.³⁵

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 GP. 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.⁷ In contrast, longitudinal studies showed conflicting results in assault rates after implementation of a workplace violence prevention programme.^{15 29 36} 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 19-21} 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.³⁰ Postincident 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, focusing on violence incidence rates and 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.³⁷ 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.'³⁸

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.²⁷ On the level of workplace design and work policies, 100% security will never be obtained. A balance has to be made between safety and quality of life and quality of care.³⁸ Some interventions proposed to increase safety might be in conflict with the goals of healthcare. 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.¹⁹

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 min.^{30 31} De-escalation is a complex and time-consuming intervention and this might explain the limited effectiveness of the training programmes.²⁶

Under-reporting 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 the taboo associated with complaining about violence. Under-reporting is also influenced by the interventions themselves and complicates research outcome and the interpretation of results.

Victims of type II workplace violence should be assisted and supported by their organisation and short-term and long term consequences should be addressed.³⁵ A decline

in frequency of assaults occurs after implementation of a peer help programme for assaulted staff.³⁹ The unavailability of debriefing is associated with increased reports of post-traumatic stress.^{40 41}

Limitations

The first limitation lies in the risk of bias across studies since mainly English and some French, German and Dutch publications were screened. Second, research on workplace violence is published in the traditional international medical scientific literature databases. The second limitation is the publication date, the literature search started in 2000. This starting time was chosen at random. To compensate however for any loss of data before this date, the very comprehensive review of Runyan *et al.*, published in the year 2000 was included in the analysis of this review. The third limitation lies in the risk of bias within studies. Only three RCTs are included in this review.^{7 28 42} Performance bias, detection bias and reporting bias are present in all studies. Due to the nature of the problem and of the interventions, allocation concealment, blinding of participants and blinding of outcome is not possible. Also as discussed in this review, under-reporting and selective reporting, a well-known issue in workplace violence, is variably present in all studies and is influenced by the intervention itself.⁷ Recall bias is also present due to data collection inquiring about violent events over the past 12 months.⁴² Finally, performance bias is present in all studies through various mechanisms: a medical care setting is a complex structure and organisational changes might have an impact on care quality and on safety performance and might interfere as a co-intervention.⁴³ Moreover, in all RCTs, the control group will always have its own safety prevention policy.

Suggestions for further research

We believe that a large and long-term cohort study could provide more insight and evidence on effective interventions to prevent aggression against the GP. Risk factors for type II workplace violence are well known but there are insufficient data on protective factors for aggression against doctors. Analysis of large data sets of a cohort should provide insight in the protective factors and effectiveness of interventions against type II workplace violence.

A yearly audit on context of aggression incidents and on the applied safety measures per general practice will add to map effective preventive measures. Basic information about recommended safety prevention measures and training on de-escalation techniques should be offered to the cohort. With respect to postevent interventions, the GPs in the study cohort could implement a shared violence incident-reporting tool.

CONCLUSION

Aggression against physicians is a well-known and serious occupational hazard. There is moderate evidence that an integrated violence prevention programme can decrease the risks of patient-to-worker violence. Appropriate

workplace design and work policies aiming to reduce risk factors and applying de-escalation techniques during an event of aggression are highly recommended. Considering that detection, reporting and performance bias are inherent to any RCT on interventions against type II workplace violence, we believe that a large cohort study would provide more evidence on the effectiveness of the interventions.

Contributors AR: setting up the design and method, data acquisition and analysis, interpretation of data, drafting the paper, approving the final version, accountable for the entire work. BS: delivering the research question, supporting, reviewing and revising the research process, performing data quality check, revising the manuscript for publication, accountable for both the work and the researcher.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

- Hills DJ, Joyce CM, Humphreys JS. A national study of workplace aggression in Australian clinical medical practice. *Med J Aust* 2012;197:336–40.
- Elston MA, Gabe J. Violence in general practice: a gendered risk? *Sociol Health Illn* 2016;38:426–41.
- Demeur V, Devos S, Jans E. Aggressie tegen de huisarts: de arts in nood. *Het profiel van de kwetsbare huisarts*. Ku Leuven, 2017.
- Vorderwülbecke F, Feistle M, Mehning M, *et al.* Aggression and violence against primary care physicians—a nationwide questionnaire survey. *Dtsch Arztebl Int* 2015;112:159–65.
- Nikathil S, Olafsson A, Gocentas RA, *et al.* Review article: workplace violence in the emergency department: a systematic review and meta analysis. *Emerg Med Australas* 2017;29:265–75.
- Kowalenko T, Cunningham R, Sachs CJ, *et al.* Workplace violence in emergency medicine: current knowledge and future directions. *J Emerg Med* 2012;43:523–31.
- Arnetz JE, Hamblin L, Russell J, *et al.* Preventing Patient-to-Worker violence in hospitals: outcome of a randomized controlled intervention. *J Occup Environ Med* 2017;59:18–27.
- Moher D, Liberati A, Tetzlaff J, *et al.* Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009;6:e1000097.
- Higgins JPT, Green S. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]*. The Cochrane Collaboration, 2011.
- Howick J, Chalmers I, OCEBM Levels of Evidence Working Group. The Oxford 2011 levels of evidence 2, 2011. Available: <http://www.cebm.net/index.aspx?o=1025>
- Guyatt GH, Oxman AD, Kunz R, *et al.* What is 'quality of evidence' and why is it important to clinicians? *BMJ* 2008;336:995–8.
- Guyatt GH, Oxman AD, Vist GE, *et al.* Grade: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008;336:924–6.
- Lewin S, Booth A, Glenton C, *et al.* Applying GRADE-CERQual to qualitative evidence synthesis findings: introduction to the series. *Implementation Sci* 2018;13(Suppl 1).
- Lipscomb J, McPhaul K, Rosen J, *et al.* Violence prevention in the mental health setting: the new York state experience. *Can J Nurs Res* 2006;38:96–117.
- Mohr DC, Warren N, Hodgson MJ, *et al.* Assault rates and implementation of a workplace violence prevention program in the Veterans health care administration. *J Occup Environ Med* 2011;53:511–6.

16. 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;12.
17. Henson B. Preventing interpersonal violence in emergency departments: practical applications of criminology theory. *Violence Vict* 2010;25:553–65.
18. Magin P, Adams J, Joy E, *et al.* Violence in general practice: perceptions of cause and implications for safety. *Can Fam Physician* 2008;54:1278–84.
19. Wright NMJ, Dixon CAJ, Tompkins CNE. Managing violence in primary care: an evidence-based approach. *Br J Gen Pract* 2003;53:557–62.
20. Phillips JP. Workplace violence against health care workers in the United States. *N Engl J Med Overseas Ed* 2016;374:1661–9.
21. Gillespie GL, Gates DM, Miller M, *et al.* Workplace violence in healthcare settings: risk factors and protective strategies. *Rehabil Nurs* 2010;35:177–84.
22. Sim MG, Wain T, Khong E. Aggressive behaviour - prevention and management in the general practice environment. *Aust Fam Physician* 2011;40:866–72.
23. Ifediora C. Exploring the safety measures by doctors on after-hours house call services. *Australas Med J* 2015;8:239–46.
24. Morken T, Johansen IH. Safety measures to prevent workplace violence in emergency primary care centres—a cross-sectional study. *BMC Health Serv Res* 2013;13:384.
25. Price O, Baker J, Bee P, *et al.* Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry* 2015;206:447–55.
26. Price O, Baker J. Key components of de-escalation techniques: a thematic synthesis. *Int J Ment Health Nurs* 2012;21:310–9.
27. Saragoza P, White SG. Workplace violence: practical considerations for mental health professionals in consultation, assessment, and management of risk. *Psychiatr Clin North Am* 2016;39:599–610.
28. Abderhalden C, Needham I, Dassen T, *et al.* Structured risk assessment and violence in acute psychiatric wards: randomised controlled trial. *Br J Psychiatry* 2008;193:44–50.
29. Runyan CW, Zakocs RC, Zwerling C. Administrative and behavioral interventions for workplace violence prevention. *Am J Prev Med* 2000;18(Suppl 4):116–27.
30. Garriga M, Pacchiarotti I, Kasper S, *et al.* Assessment and management of agitation in psychiatry: expert consensus. *World J Biol Psychiatry* 2016;17:86–128.
31. Richmond JS, Berlin JS, Fishkind AB, *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* 2012;13:17–25.
32. Kohlrieser G. *Hostage at the table: how leaders can overcome conflict, influence others, and raise performance.* Jossy-Bass, 2006.
33. Geoffrion S, Lanctôt N, Marchand A, *et al.* Predictors of trivialization of workplace violence among healthcare workers and law enforcers. *J Threat Assess Manag* 2015;2:195–213.
34. Naish J, Carter YH, Gray RW, *et al.* Brief encounters of aggression and violence in primary care: a team approach to coping strategies. *Fam Pract* 2002;19:504–10.
35. Schat ACH, Kelloway EK. Reducing the adverse consequences of workplace aggression and violence: the buffering effects of organizational support. *J Occup Health Psychol* 2003;8:110–22.
36. Magnavita N. Violence prevention in a small-scale psychiatric unit: program planning and evaluation. *Int J Occup Environ Health* 2011;17:336–44.
37. Robson LS, Clarke JA, Cullen K, *et al.* The effectiveness of occupational health and safety management system interventions: a systematic review. *Saf Sci* 2007;45:329–53.
38. James S, Cawood C. Violence assessment and intervention. In: *The practitioner's handbook*. 2nd edn, 2009: 377.
39. Joa TS, Morken T. Violence towards personnel in out-of-hours primary care: a cross-sectional study. *Scand J Prim Health Care* 2012;30:55–60.
40. Arnetz JE, Hamblin L, Ager J, *et al.* Application and implementation of the hazard risk matrix to identify Hospital workplaces at risk for violence. *Am J Ind Med* 2014;57:1276–84.
41. Runyan CW. Moving forward with research on the prevention of violence against workers. *Am J Prev Med* 2001;20:169–72.
42. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical intervention programme for dealing with violence towards health care workers. *J Adv Nurs* 2000;31:668–80.
43. Rogers P, Miller G, Paterson B, *et al.* Is breakaway training effective? examining the evidence and the reality. *J MH Training, Ed and Practice* 2007;2:5–12.
44. Hvidhjelm J, Sestoft D, Skovgaard LT, *et al.* Sensitivity and specificity of the Brøset violence checklist as predictor of violence in forensic psychiatry. *Nord J Psychiatry* 2014;68:536–42.
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* 2018;21:31–5.
46. Nau J, Dassen T, Needham I, *et al.* The development and testing of a training course in aggression for nursing students: a pre-and post-test study. *Nurse Educ Today* 2009;29:196–207.
47. Hills DJ, Joyce CM, Humphreys JS. Workplace aggression prevention and minimisation in Australian clinical medical practice settings – a national study. *Aust. Health Review* 2013;37:607–13.
48. Gillespie GL, Gates DM, Mentzel T, *et al.* Evaluation of a comprehensive ED violence prevention program. *J Emerg Nurs* 2013;39:376–83.
49. Holloman GH, Zeller SL. Overview of project beta: best practices in evaluation and treatment of agitation. *West J Emerg Med* 2012;13:1–2.
50. Stowell KR, Florence P, Harman HJ, *et al.* Psychiatric evaluation of the agitated patient: consensus statement of the American association for emergency psychiatry project beta psychiatric evaluation Workgroup. *West J Emerg Med* 2012;13:11–16.
51. Wilson MP, Pepper D, Currier GW, *et al.* The psychopharmacology of agitation: consensus statement of the American association for emergency psychiatry project beta psychopharmacology Workgroup. *West J Emerg Med* 2012;13:26–34.
52. Morken T, Johansen IH, Alsaker K. Dealing with workplace violence in emergency primary health care: a focus group study. *BMC Fam Pract* 2015;16:51.
53. Magin P. General practice as a fortress. *Aust Fam Physician* 2010;39.
54. Magin P, Adams J, Joy E. Occupational violence in general practice. *Aust Fam Physician* 2007;36:955–7.
55. The Royal Australian College of General Practitioners. *General practice – a safe place. A guide for the prevention and management of patient-initiated violence*, 2015. <http://www.racgp.org.au/download/documents/PracticeSupport/2011asafeplace-tipsandtools.pdf>
56. Wax JR, Pinette MG, Cartin A. Workplace Violence in Health Care-It's Not "Part of the Job". *Obstet Gynecol Surv* 2016;71:427–34.
57. Occupational Safety and Health Administration. Guidelines for preventing workplace violence for healthcare and social service workers, 2016. Available: <https://www.osha.gov/Publications/OSHA3148.pdf>
58. Calow N, Lewis A, Showen S, *et al.* Literature synthesis: patient aggression risk assessment tools in the emergency department. *J Emerg Nurs* 2016;42:19–24.
59. Kynoch K, Wu C-J, Chang AM. Interventions for preventing and managing aggressive patients admitted to an acute hospital setting: a systematic review. *Worldviews Evid Based Nurs* 2011;8:76–86.
60. Lipscomb JA, El Ghaziri M. Workplace violence prevention: improving front-line health-care worker and patient safety. *New Solut* 2013;23:297–313.
61. Wassell JT. Workplace violence intervention effectiveness: a systematic literature review. *Saf Sci* 2009;47:1049–55.
62. Morphet J, Griffiths D, Beattie J, *et al.* Prevention and management of occupational violence and aggression in healthcare: a scoping review. *Collegian* 2018;25:621–32.
63. Wiskow C. *Guidelines on workplace violence in the health sector, comparison of major known national guidelines and strategies*, 2003.
64. WorkSafe Victoria. Prevention and management of violence and aggression in health services 2017.
65. NICE. Violence and aggression, short-term management in mental health, health and community settings: updated edition, 2015. Available: <http://www.ncbi.nlm.nih.gov/pubmed/26180871>
66. FOD Binnenlandse Zaken, FOD Volksgezondheid. *Veiligheid voor huisartsen*, 2009
67. IBZ. *Een veilige dokterspraktijk*, 2017. Available: <https://www.besafe.be/publicaties/een-veilige-dokterspraktijk>
68. Aydin B, Kartal M, Midik O, *et al.* Violence against general practitioners in turkey. *J Interpers Violence* 2009;24:1980–95.
69. Zhao S, Qu L, Liu H, *et al.* Coping with workplace violence against general practitioners and nurses in Heilongjiang Province, China: social supports and prevention strategies. *PLoS One* 2016;11:e0157897–14.
70. 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;56:401–19.
71. Landau SF, Bendalak J, Amitay G, *et al.* Factors related to negative feelings experienced by emergency department patients and accompanying persons: an Israeli study. *Isr J Health Policy Res* 2018;7:1–9.