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REVIEW ARTICLE

# Review article: Identifying occupational violence patient risk factors and risk assessment tools in the emergency department: A scoping review

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## Abstract

Occupational violence (OV) is a daily risk for ED staff. It contributes to staff stress, sick leave, turn-over and burn-out, and limits the capacity of staff to provide unimpeded quality care to patients and their families. Many factors contribute to incidents of OV; however, early detection of such risk factors could pre-empt incidences of OV during ED episodes of care. A five-stage methodological framework for scoping reviews was used to identify, summarise and synthesise OV risk factors from five key databases. A validated tool was used to appraise the quality of included studies. Independent evaluation by the reviewers was used throughout. Patient factors were extracted and described from 24 methodologically and geographically diverse papers. Methodological quality for these studies varied from moderate to high. A total of 34 OV risk factors were identified. Although there was variation in, and differences between, staff-perceived and objective (documented) OV risk factors, patient risk factors can be categorised into three main groups: clinical presentation, behaviours and past history. Five existing ED OV risk assessment tools were identified, with limited supporting evidence for each. The results support the development of a reliable and validated OV risk assessment tool to be initiated at triage.

**Key words:** *emergency service, nurse, risk assessment, scoping review, workplace violence.*

## Key findings

- There is a broad list of staff-perceived and objective patient risk factors that could predict occupational violence in the ED.
- Patient risk factors fall into three key areas: clinical presentation, behaviours and history; but no current tool includes all three components.
- There are 'prompting' systems for nurses to assess risk of occupational violence in the ED, but no developed risk assessment tools.

## Background

Occupational violence (OV) has been defined as, 'the infliction, or threat, of harm or injury (either physical or psychological) upon another person'[1] in the course of their professional responsibilities. It includes verbal, abuse, threats or intimidating behaviour and intentional physical attacks.[1] OV in the ED is common;[2] more common than in other hospital settings.[3] Estimates suggest a pooled incidence of 36 in every 10 000 presentations to the ED will be violent; however, this systematic review cautions significant underreporting by ED staff.[4] Although the literature includes disparate reports of the incidence of OV in the ED, the negative impact of OV on staff is very consistent. Incidents of OV immediately leave staff feeling traumatised, stressed, sad, shocked, confused, angered and embarrassed.[2] Long-term consequences of OV have also been observed, and include loss of confidence, absenteeism, emotional detachment, self-medicating behaviours, and increased staff turn-over.[2] The presence of security personnel in many EDs can help offset such risks to staff but, as ever, prevention is far more likely to improve staff morale and other patients' perceptions than management.[5] Thus, it is imperative to implement measures that can reduce or help manage the incidence of OV in EDs.

One of the strategies that is gaining momentum in emergency care is the increasing utilisation of risk assessment tools.[6] The purpose of risk assessment tools is to provide staff with the opportunity to undertake appropriate precautions and instigate early interventions to limit the impacts of moderate- to high-risk staff–patient encounters.[7] ED patients and their carers also expect ED staff to accurately identify and proactively manage potentially violent patients.[8] To this end, the

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impact of OV risk assessment on clinical practice is promising. Although a previously implemented risk assessment tool did not reduce incidences of OV, it led to fewer unplanned interventions for OV and less staff time spent managing OV incidents in ED.[8]

It is unclear at what point during the patient's ED visit preliminary assessment for the risk of OV is optimal; however, there is sound justification for the initiation of such risk assessments at triage. Triage is the first point of contact for patients where patients' clinical histories and presenting complaints are routinely assessed, and often nurses can detect and also be subjected to patients' expressions of frustrations, about issues such as pain and long waiting periods.[9] Moreover, triage nurses report that behavioural risk factors of OV, such as anxiety, agitation, demanding behaviour or restlessness, are exhibited in the waiting area, and their ability to recognise these behaviours could be key to identifying potential perpetrators and reducing the impacts of OV by, for example, initiating early interventions.[10] Patient personal characteristics such as history of violence, mental illness, cognitive impairment or drug and/or alcohol intoxication, available during initial contacts with presenting patients, could also be important early predictors of OV.[11,12]

Despite an apparently wide body of evidence exploring OV in healthcare, and specifically in EDs,[4,6,13–18] OV risk assessment is underdeveloped. Therefore, the aims of this scoping review were to synthesise patient factors associated with increased risk of OV, and to explore and summarise the validity of existing OV risk assessment tools in the ED.

## Scoping review methods

Scoping review methodology was selected because scoping reviews are useful for a broad analysis of literature, particularly when exploring an area of study with limited research that includes a diverse range of methodologies.[19] This scoping review was guided by the methodological framework proposed by Colquhoun and O'Brien[19] to collate and synthesise the current knowledge base and identify knowledge gaps. The framework sets out a multistage process, where Stage 1 is the identification of the scoping review question to inform selection of key search terms; Stage 2 consists of identification of relevant studies from a range of relevant databases; Stage 3 involves selection of the subset of relevant studies that address the review question, based on inclusion and exclusion criteria; Stage 4 is extraction of pertinent data from relevant studies; and finally, Stage 5 where data are collated, summarised and synthesised to enable the review aim to be addressed. Application of such methodology results in transparency in the methodological and analytical decisions.

### *Stage 1: Review questions*

The scoping review questions were as follows:

1. Which patient factors could be incorporated in an evidence-based risk assessment tool applied early in an ED patient's journey (i.e. triage)?
2. Which OV risk assessment tools have been used in EDs, and what was their predictive validity?

#### *Inclusion criteria*

The inclusion criteria applied are set out diagrammatically in Figure 1, PRISMA diagram. For studies to be included, they had to meet all the inclusion criteria (Fig. 1). For the purpose of this review, patient-related risk factors are characteristics or behaviours of a patient that are associated with the risk of OV occurring;[3] whereas risk assessment could be in a form of a tool or measure aimed to identify or predict the risk of OV perpetrated by patients in the ED.[6]

### *Stage 2: Identification of studies*

A comprehensive literature search was developed with the assistance of a specialist health librarian and conducted to identify published and grey literature. A limited search in CINAHL and PubMed was undertaken to develop and refine the most appropriate search strategy using keywords and subject headings that would yield the most relevant literature. Author review and discussion of search results enabled development and application of a systematic search of scientific databases using the search strategy (Table S1). Searches included CINAHL, EMBASE, PubMed, Scopus and ProQuest Dissertations and Theses databases from the beginning of indexing until July 2018. Reference chaining; searching the reference list of all relevant studies was also employed.

### *Stage 3: Selection of relevant studies*

All citations identified by the systematic searches were imported into EndNote (Version X9, Clarivate Analytics), duplicates removed and entries screened using title and abstract for relevance to the topic. Studies were deemed relevant if the title and/or abstract included descriptions of risk factors of OV in the ED. Subsequently, the full text of citations was retrieved and independently assessed for eligibility based on the inclusion criteria by two reviewers (CJC and MSM). The rigour of each study was also recorded independently by two reviewers (CJC and ANBJ) using the mixed methods appraisal tool.[20] A consensus approach was used to confirm mixed methods appraisal tool ratings and where differences arose, papers were reviewed and discussion ensued until consensus was reached. The reviewers were cognisant of the risk of power imbalance; therefore, clear and objective justification of assessments and ratings were required as part of the decision-making process.

### *Stage 4: Data extraction*

An electronic data extraction form (Excel®, Microsoft Corporation, Sydney, Australia) was developed using an iterative process. This is a standard process to enable the reviewers to organise relevant

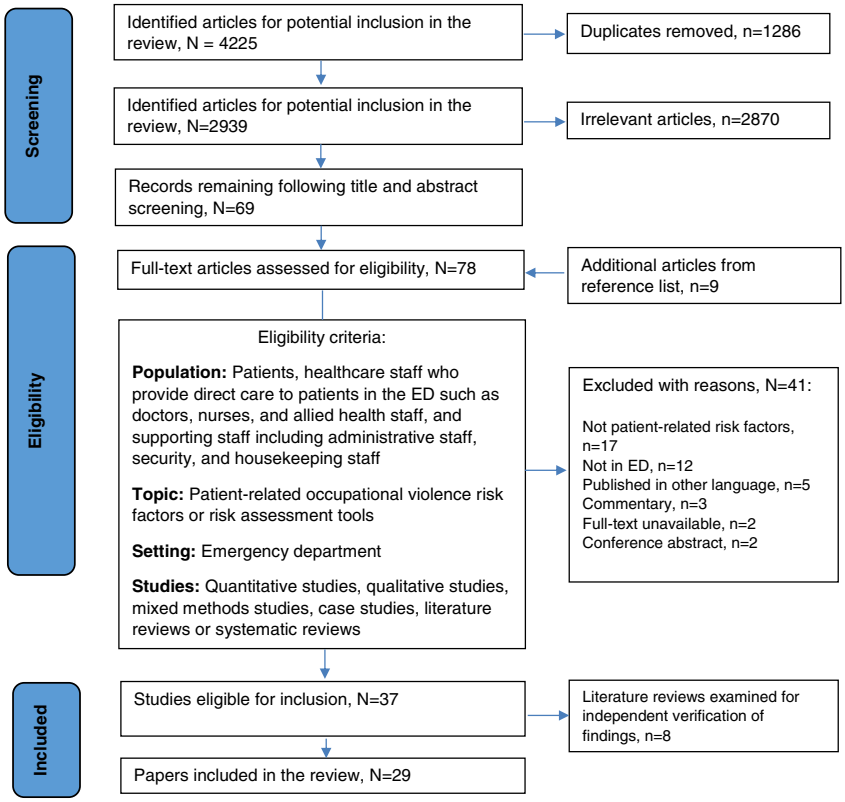


**Figure 1.** *Study flow diagram schematically depicting the search and literature delineation processes applied to inform the study findings (reproduced from Moher et al.[50]).*

information systematically and logically to inform review findings and identify knowledge gaps. Hence, extracted data included year of publication, country of origin, study objective, design, sample size, patient-related risk factors, source of data (i.e. nurses, OV incidents) and OV definition. Additional data items such as specificity, sensitivity and likelihood ratio were extracted for risk assessment tools. Data extraction was independently verified by two reviewers (CJC and ANBJ) to ensure accuracy and completeness.

### *Stage 5: Data synthesis*

There is no current standard process of analysing scoping review results; however, it is recommended that qualitative analysis techniques be used for scoping review synthesis.[19] Data synthesis was guided by Braun and Clarke's[21] technique: data familiarisation, coding, searching for themes, reviewing themes, defining themes and thematic analysis.

## Results

### *Scoping review findings*

There were 78 publications that were deemed potentially relevant to the research question (Fig. 1). Of these, 41 publications were excluded; hence, findings from 29 publications were synthesised: 21 quantitative from studies, four from qualitative studies and four from mixed methods. Eight literature or systematic reviews included broad discussions of OV (rather than systematic data syntheses of risk factors); hence, they were used to validate the synthesised findings herein. Characteristics of included studies are summarised in Table 1.

There was broad geographical variation in the primary studies: 13 were conducted in Australia,[8–10,22–31] three were from the USA,[32–34] three from the UK,[35–37] and a study each from Canada,[38] Cyprus,[39] Italy,[40] Jordan,[41] Lebanon,[42] Morocco,[43] Nigeria,[44] Palestine,[45] Singapore,[46] and Taiwan.[47] Twenty-seven (93%) studies scored 50–100% in the mixed methods appraisal tool indicating moderate to high quality. Only four studies (13.8%) were solely focused in the triage setting.

The definitions used to categorise OV varied between studies; however, all studies essentially conformed to an overarching definition of OV as any physical attack or verbal abuse that occurs in the workplace or associated with the workplace that could potentially lead to physical and/or psychological harm. Harmful physical contact can include (but not limited to) striking, slapping, punching, spitting, kicking, choking, biting, pushing, sexual assault and use of weapons against staff. Verbal abuse can include (but not limited to) yelling, insults, intimidation, threats, bullying, harassment, use of derogatory gestures and swearing.[4,6,8–10,14,15,18,23–26,29,30,32,33,39–41,43,45,47]

OV incidents varied between EDs, which ranged from 1.4 to 17 per 1000 presentations.[8,22,24,29,36] At least 65% of ED staff experienced OV. Specifically, 23–92% of staff experienced physical OV whereas 73–98% of staff experienced verbal form of OV.[9,25,29,34,39,41–45,47]

### *Risk factors of occupational violence*

Study results were categorised into two broad pools: patient-related risk factors in the ED as reported on interview or generally perceived by ED staff ($n$ = 20 studies) and patient-related risk factors as documented by ED staff on the medical records of patients involved in OV incidents ($n$ = 9 studies). Studies exploring perceived patient risk factors for OV were mostly cross-sectional; whereas, the remaining were qualitative study designs. Studies that show the strength of association between documented risk factors and OV incidents were mainly case–control studies, hence referred to as objective risk factors in this review. In both,

**TABLE 1.** *Characteristics of studies included in the scoping review* (n = 29)

| Study | Design | Country | MMAT (%) | Year published | Source of data | Sample size (*n*) | Approximate annual ED presentations | OV incidence rate | % of staff who experienced OV in the past 12 months |
|---|---|---|---|---|---|---|---|---|---|
| Cembrowicz and Shepherd[35] | Retrospective observational | England | 75 | 1992 | OV incidents | Unclear | 50 000 | — | — |
| Brookes and Dunn[22] | Observational | Australia | 50 | 1997 | OV incidents | 79 | 56 000 | 2.8 per 1000 presentations | — |
| Jenkins *et al.*[37] | Cross-sectional | UK | 75 | 1998 | Doctors | 233 | — | — | — |
| Mayer *et al.*[34] | Cross-sectional | USA | 25 | 1999 | Nurses | 226 | — | — | 42% physical OV; 95% verbal OV |
| Lyneham[27] | Mixed methods | Australia | 25 | 2000 | Nurses | 266 | — | — | — |
| Crilly *et al.*[24] | Cross-sectional | Australia | 100 | 2004 | Nurses | 71 | 80 000 (aggregate of two EDs) | Two per 1000 patients | — |
| James *et al.*[36] | Retrospective observational | UK | 100 | 2006 | OV incidents | 218 | Over 100 000 | 1.4 per 1000 presentations | — |
| Luck *et al.*[26] | Qualitative | Australia | 100 | 2007 | Nurses | 20 | — | — | — |
| Tang *et al.*[47] | Cross-sectional | Taiwan | 100 | 2007 | Nurses | 236 | — | — | 30% physical OV; 92% verbal OV |
| Wilkes *et al.*[31] | Delphi technique | Australia | 50 | 2007 | Nurses | 23 | — | — | — |
| Chapman *et al.*[23] | Mixed methods | Australia | 100 | 2009 | Nurses | 35 | — | — | — |
| Belayachi *et al.*[43] | Cross-sectional | Morocco | 50 | 2010 | Doctors | 60 | Over 60 000 | — | 70% experienced any type of OV |
| Pich *et al.*[10] | Qualitative | Australia | 75 | 2011 | Nurses | 6 | 60 000 | — | — |
| Alameddine *et al.*[42] | Cross-sectional | Lebanon | 100 | 2011 | Doctors, nurses, administrative staff, security, trainees | 256 | — | — | 81% experienced any type of OV |
| Chaput *et al.*[38] | Retrospective observational | Canada | 100 | 2011 | OV incidents | 1452 | — | — | — |
| Ogundipe *et al.*[44] | Cross-sectional | Nigeria | 75 | 2013 | Nurses | 81 | — | — | 65% experienced any type of OV |
| Morphet *et al.*[28] | Delphi technique | Australia | 100 | 2014 | Nurses | 157 | — | — | — |
| Tan *et al.*[46] | Qualitative | Singapore | 75 | 2015 | Nurses | 10 | — | — | — |
| Darawad *et al.*[41] | Cross-sectional | Jordan | 75 | 2015 | Nurses | 174 | — | — | 23% physical OV; 95% verbal OV |

**TABLE 1.** *Continued*

| Study | Design | Country | MMAT (%) | Year published | Source of data | Sample size (*n*) | Approximate annual ED presentations | OV incidence rate | % of staff who experienced OV in the past 12 months |
|---|---|---|---|---|---|---|---|---|---|
| Hamdan and Abu Hamra[45] | Cross-sectional | Palestine | 100 | 2015 | Nurses, doctors, administrative staff | 444 | — | — | 36% physical OV; 71% verbal OV |
| Vezyridis *et al.*[39] | Cross-sectional | Cyprus | 100 | 2015 | Nurses, doctors | 220 | — | — | 28% physical OV; 73% verbal OV |
| Bresler and Gaskell[32] | Case study | USA | 50 | 2015 | OV incidents | 3 | — | — | — |
| Daniel[8] | Mixed methods | Australia | 100 | 2015 | | | 65 000 | 17 per 1000 presentations | — |
| | Study 1: Qualitative | | | | Observations of routine patient assessment at triage | 167 | | | |
| | Study 2: Case–control | | | | OV incidents | Cases, *n* = 950 | | | |
| | Study 3: Tool validity testing | | | | Presentations | Controls, *n* = 55, 155 | | | |
| Egerton-Warburton *et al.*[25] | Mixed methods | Australia | 100 | 2016 | Doctors, nurses | 2002 | — | — | 92% alcohol-related physical OV; 98% alcohol-related verbal OV |
| Pich *et al.*[9] | Cross-sectional | Australia | 50 | 2017 | Nurses | 531 | — | — | 87% experienced any type of OV |
| Ramacciati *et al.*[40] | Qualitative | Italy | 100 | 2018 | Nurses | 265 | — | — | — |
| Dawson *et al.*[33] | Case–control | USA | 100 | 2018 | OV incidents | Cases, *n* = 22; Control, *n* = 229 | — | — | — |
| Nikathil *et al.*[29] | Retrospective observational | Australia | 100 | 2018 | OV incidents | 1853 | 60 000 | 11 per 1000 presentations | — |
| Partridge and Affleck[30] | Tool testing | Australia | 100 | 2018 | Patients | 2064 | — | — | — |

MMAT, Mixed Methods Appraisal Tool; OV, occupational violence; —, data not available from publication.

there were a total of 34 patient-related risk factors that were best grouped into three categories: factors around clinical presentation, observed behaviours and history (Table 2).

### *Characteristics associated with patient's clinical presentation*

Shared (perceived and objective) risk factors around patient presentation included patients with alcohol and/or drug intoxication, or otherwise altered cognitive state (i.e. confusion, dementia). Factors reported by ED staff but not established objectively included patient pain or discomfort, patients exhibiting drug seeking behaviours, patients who were parents of young children, patients who were older adults and patients who presented around suicidal or self-harming behaviours. Studies exploring objective risk factors in patients who were linked to reported instances of OV highlighted being male, patients in younger age groups, mental health patients who are non-compliant with medications, patients brought in by police, or brought in by ambulance (Table 2).

### *Patient behaviours*

There was a wide range of behaviours reported by staff, including irrational or 'bad' attitudes; demanding, dissatisfied, unhappy, angry, anxious, irritable, distressed or frustrated demeanour; patients who made inappropriate eye contact including glaring or staring; patients who used apparently inappropriate tones of voice (i.e. sarcasm and demeaning); patients who mumbled; patients who intimidated via use of threatening language or clenched fists. Their association with an OV event was rarely assessed.

### *Patient's history*

Mental illness, substance abuse, previous history of aggression (also includes domestic violence or elderly abuse) were shared risk factors of OV. Objectively, patients who presented to the ED involuntarily and had a criminal history were associated with OV incidents.

### *ED-specific occupational violence risk assessment tools*

Five ED-specific risk assessment tools were found in the literature: (i) Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling, and Pacing (STAMP);[26] (ii) 17-cue violent assessment tool;[31] (iii) STAMPEDAR;[23] (iv) Violence Risk Screen Decision Support in triage (VRSDSiT);[8] and (v) Broset Violence Checklist (BVC).[30] Of these tools, only the BVC and VRSDSiT included some analysis of predictive validity for physical OV. No tools were designed to predict verbal forms of OV. With the exception of the BVC, the risk assessment tools proposed for use in ED were designed to be aide-memoires (Table 3). The tools included a varying number of items (1–17), some requiring simple observation and some requiring direct interrogation of the presenting patient.

The BVC had better predictive validity than the VRSDSiT. A score of ≥3 on the BVC is good predictor of (positive likelihood ratio = 71.4) a physical OV incident (Table 3).

## Discussion

Comprehensive review and synthesis of the literature suggests that three classes of patient factors can be used to help assess the risk of OV in the ED. These classes are characteristics associated with clinical presentation of the patient, patient history and concurrent patient behaviours (Fig. 2). Each class included a range of well-recognised and commonly validated components, acknowledged in many of the studies. These could each be incorporated into evidence-based risk assessment to be applied early in each patient's ED journey. However, there are some reservations that should be considered prior to development of such a tool.

Scoping review findings show that there is discrepancy between staff reported and objectively documented patient factors linked to risks of OV. For example, staff reported during interviews that they believe that pain, drug seeking behaviours, parents of young children, older adults, suicidal or self-harming patients are likely to perpetrate OV, but these factors are not more frequently documented in studies examining incidents of OV. This suggests either biased ED staff perceptions of the instigating conditions around OV incidents or, more likely, limited documentation of the factors associated with incidents of OV. Given the busy, challenging environment in which most ED nurses operate, it is not unreasonable that the subtle detail of potentially dangerous patient behaviours or warning signs of OV do not form a key part of the documentation of OV when such events occur. Nevertheless, it is plausible that OV risk could be identified from either or a combination of, patients' clinical presentations, exhibited behaviours at triage, and historical characteristics. Whereas these findings are reflected in, and endorsed by previous reviews,[4,6,13–18] specific risk factors from each category that could be incorporated in an accurate evidence-based OV risk assessment tool remain uncertain.

The available risk assessment tools explored in an ED context serve primarily as 'aide-memoires' and are predominantly focused on patient behaviours.[8,16,26,31] For example, STAMP was designed as a 'practical guide' and rapid assessment for ED nurses.[26] The VRSDSiT was designed to prompt nurses to assess the presence or absence of risk factors (i.e. involvement in assault, intoxication, acute mental health symptoms, brought in by police, history of violence, behavioural cues), rather than as an actuarial risk assessment tool.[8] Although this method of risk assessment is pragmatic, it renders itself to the biases of the assessor which could lead to either false negative or positive results.[48] Given the risks of harm to staff, misappropriation of resources, and even possible mistreatment of patients when OV risks are incorrectly assessed,[48] these tools need to be implemented with caution. If the purpose is to initiate identification and intervention early in the patient's ED presentation (such as in triage), the time critical nature of triage and the increasing pressures of ED crowding and possible patient

**TABLE 2.** *Staff reported and objective occupational violence risk factors in the ED*

| | Staff reported OV risk factors ($n$ = 20 studies) | | Objective OV risk factors ($n$ = 9 studies) | |
|---|---|---|---|---|
| Risk factors | Number of studies | References | Number of studies | References |
| Characteristics associated with clinical presentation | | | | |
| Alcohol and/or drug intoxication | 17 | 9,23–25,27,28,34,37,39,41–47 | 8 | 8,22,29,32,33,35,36,38 |
| Altered cognitive state (i.e. confusion, dementia) | 5 | 10,34,37,41,46 | 2 | 8,30 |
| Pain or discomfort | 3 | 28,44,45 | — | — |
| Drug seeking behaviours | 2 | 28,41 | — | — |
| Parents of young children | 2 | 10,28 | — | — |
| Older adults | 1 | 28 | — | — |
| Suicidal or self-harming | 1 | 46 | — | — |
| Male patients | — | — | 4 | 8,33,35,38 |
| Younger age | — | — | 3 | 8,35,38 |
| Non-compliant with medications (mental health patients) | — | — | 2 | 32,38 |
| Female patients | — | — | 1 | 36 |
| Brought in by police | — | — | 1 | 8 |
| Brought in by ambulance | — | — | 1 | 8 |
| Patient behaviours | | | | |
| Irrational or bad attitude | 5 | 23,24,31,39,40 | — | — |
| Demanding | 3 | 24,31,47 | — | — |
| Pacing or restlessness | 2 | 26,31 | 1 | 32 |
| Dissatisfied, unhappy, or frustrated | 2 | 23,46 | — | — |
| Glaring or staring | 2 | 26,31 | — | — |
| Angry | 2 | 28,44 | — | — |
| Distressed | 2 | 28,45 | — | — |
| Tone of voice (i.e. sarcasm, demeaning, boisterous) | 2 | 26,31 | 1 | 30 |
| Anxiety | 1 | 26 | — | — |
| Clenched fist | 1 | 31 | — | — |
| Irritable | 1 | 31 | 1 | 30 |
| Intimidating | 1 | 31 | — | — |
| Mumbling | 1 | 26 | — | — |
| Resisting care | 1 | 31 | 1 | 32 |
| Threatening | 1 | 31 | 1 | 30 |
| Attacking objects | — | | 1 | 30 |
| Patient history | | | | |
| Mental illness | 9 | 9,10,28,39,41–45 | 6 | 8,29,32,33,35,36 |
| Substance abuse | 2 | 9,39 | 2 | 33,38 |
| Previous history of aggression (also includes domestic violence or elderly abuse) | 2 | 44,46 | 1 | 33 |
| Involuntary admission | — | — | 1 | 38 |
| Criminal history | — | — | 1 | 38 |

**TABLE 3.** *Validities of occupational violence risk assessment tools specifically developed for use in the ED*

| Tool | Sensitivity | Specificity | Positive predictive value | Positive likelihood ratio |
|---|---|---|---|---|
| STAMP[26] | None | None | None | None |
| Served as guide for clinicians to identify *observable* behaviours that indicate risk of violence. The acronym stands for Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling, and Pacing | | | | |
| STAMPEDAR[23] | None | None | None | None |
| In addition to Luck *et al.*'s[26] STAMP, this study added EDAR, which stands for Emotions, Disease Process, Assertive/non-Assertive, Resources | | | | |
| 17-cue assessment tool[31] | None | None | None | None |
| Designed to short-list behavioural risk factors that can be easily *observed*: threat of harm, aggressive or threatening statements, intimidation, clenched fists, resisting care, prolonged or intense glaring, name calling, yelling, increase in volume of speech, irritability, pacing, sharp or caustic retorts, demeaning inflection, belligerence, demanding attention and humiliating remarks | | | | |
| Violence Risk Screen Decision Support in triage[8] | 56.4% | 97.1% | 24.1% | 20.7 |
| Computer screen prompt for triage nurses, "At risk of violence/or aggression?" that would prompt the nurse to determine presence risk factors at triage such as involvement in assault, intoxication, acute mental health symptoms, brought in by police, history of violence and behavioural cues (i.e. uncooperative, hostile, intrusive or making verbal or physical threats). If the answer was yes, the patient was flagged as an OV risk | | | | |
| Broset Violence Checklist[30] | 1 = 88.6%<br>2 = 65.7%<br>≥3 = 45.7% | 1 = 92.9%<br>2 = 97.8%<br>≥3 = 99.4% | 1 = 16.7%<br>2 = 34.3%<br>≥3 = 55.2% | 1 = 11.6<br>2 = 30.3<br>≥3 = 71.4 |
| Administered by security officers and scored against the presence of three characteristics: confusion, irritability and boisterousness; and three behaviours: verbal threats, physical threats and attacking objects. Each factor is scored 1 if present; scores are summed and ranges from 0 to 6. Zero suggests that risk of violence in the next 24 h is low; 1–2 corresponds to moderate risk; and a score of ≥3 is high risk | | | | |

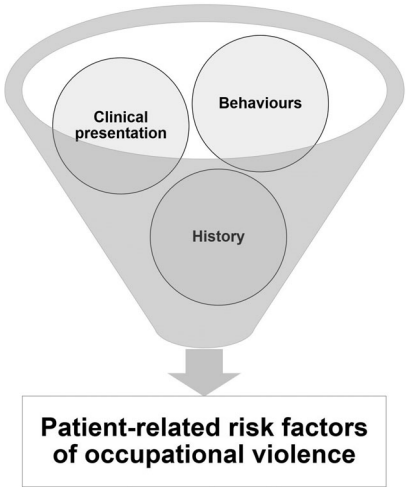


**Figure 2.** *Three key categories of patient-related occupational violence risk factors in ED: characteristics of their clinical presentation, their behaviours and history.*

deterioration where delays to the instigation of care occur should also be considered. Each of those tools includes multitude of possible individual items that should be considered by the ED nurse, so this limits their utility. Triage nurses reported that they prefer a rapid and brief (i.e. 3–5 checklist items) tool in an OV risk assessment tool to be used at triage (Cabilan, Johnston and Eley, 2019, Unpublished).

Only the BVC had been used as an actuarial risk assessment tool in an ED.[30] Although the BVC was easy to use and had good predictive validity for physical OV,[30] there is a risk that other important predictive factors such as patient's clinical presentation and history, not included in this tool, could be overlooked. Evidence herein suggests that these factors can also be critical for triage nurses to determine a patient's level of risk for OV.[8,26] Nurses report that information provided by police or ambulance officers, alongside patient's behaviours or body language during triage interactions, can be used to ascertain the risk of violence.[8] Thus, such a unidimensional approach to risk assessment seems incongruent to common practice.

### *Limitations*

This review has several limitations. First, many of the studies are descriptive; hence they do not provide empiric evidence of the strength of association between risk factors and OV. Second, no studies report factors associated with OV risk from a patient, carer or bystander perspective. Patient's self-report of their risk for violence is a significant predictor of their future violent behaviour.[49] However, it is worth noting that this can only be assessed through direct questioning, which is met with apprehension by triage nurses. Interviewing is not always employed because of privacy concerns; rapport has not yet been established; and because it may even trigger aggression or violence.[8] Although patients' self-reported level of risk is vital, it might not yet be feasible. Fourth, geographical and cultural bias is plausible because, due to budgetary constraints, only studies published in English could be included. Fifth, the international representativeness of the conclusions could be challenged because a substantial proportion (44%) of studies were from Australia. Finally, the risk assessment tools described are biased towards physical OV. Critically, neither tools explore predictors of verbal OV which can also be traumatic and demotivating.[2]

## Conclusions

There is a body of work documenting and exploring factors associated with OV in EDs. Characteristics associated with a patient's clinical presentation, their behaviours and their history could contribute to a determination of their OV risk; however, specific risk factors from their presentation, behaviour and history are yet to be defined. Some risk factors, particularly patient behaviours, have already been incorporated into OV risk assessment tools that have been used in EDs with limited success. Future research can therefore, focus on the further development and refinement of such tools and evaluation of their impact on the clinical practice environment.

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### *Competing interests*

None declared.

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## Supporting information

Additional supporting information may be found in the online version of this article at the publisher's web site:

**Table S1.** Search terms and strategies deployed to collate maximal relevant literature from database searches.