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REVIEW ARTICLE

Frequency of violence towards healthcare workers in the United States' inpatient psychiatric hospitals: A systematic review of literature

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ABSTRACT: *The purpose of this systematic review is to determine the frequency of violent or aggressive behaviour towards healthcare workers in inpatient psychiatric settings in the United States. To achieve this aim, five databases were searched to find English-language quantitative studies reporting prevalence or incidence data of violence or aggression directed towards staff members in inpatient psychiatric settings. No limitations were set based on publication date, and intervention studies were included only if baseline data were provided. Of 335 total studies found, 38 full-text articles were suitable for full-text analysis based on inclusion and exclusion criteria, and 14 were included in the final review. Years of data collection ranged from 1986 to 2018, and a range of psychiatric facilities were represented, from small, private hospital units to large forensic institutions. Researchers utilized surveys, real-time incident reporting tools, and government databases, or a combination of strategies, to collect data related to workers' experiences on the job. Included research indicates that workplace violence in the U.S. inpatient psychiatric setting is a widespread problem, with 25–85% of survey respondents reporting an incident of physical aggression within the year prior to survey, and statewide workers' compensation findings indicating 2–7 claims due to assault per 100 000 employee hours. There are substantial differences between findings based on measurement strategy, making it difficult to arrive at a single estimate of prevalence nationally. As management of this persistent problem receives continued attention from stakeholders, it becomes increasingly important to define and measure the problem with the most appropriate tools.*

KEY WORDS: *inpatient, nursing, psychiatry, risk management, workplace violence.*

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INTRODUCTION

According to the United States Bureau of Labor Statistics (U.S. BLS), 69% of all non-fatal violent incidents at work that resulted in days off are in the healthcare industry (United States Bureau of Labor Statistics 2018). In addition, the agency has reported that psychiatric and substance abuse hospitals have the highest incidence rates for non-fatal injuries and illnesses among all healthcare facilities with 7.8 cases per 100 full-time employees annually (U.S. BLS 2018). Workplace violence is increasingly recognized as a barrier to the provision of high-quality care. Researchers Lanctot and Guay (2014) conducted a systematic review of

studies measuring the consequences of exposure to violence on the job in healthcare settings, finding that physical, emotional, and psychological consequences were pervasive, and that inability to perform the work role adequately was widespread following such experiences. More serious incidents can lead to time away from work, costing employers and state-run workers' compensation systems considerable expense. In addition, when such events occur, entire workplaces can experience psychological harm, which risks further compromising worker safety and morale.

Healthcare workers in psychiatric treatment settings often face increased risk for violence for multiple reasons, most prominently because psychiatric hospitals are among the only settings in health care where patients may be treated on an involuntary basis. In addition, patients may face legal consequences for failing to participate in treatment in cases where they have been charged with a crime (Lamb & Weinberger 2017), a situation which is particularly problematic in jurisdictions with punitive instead of recovery-oriented approaches to drug use or dependency. Researchers have identified aspects of the interaction between patients, staff, and the surrounding environment which contribute to violence beyond what is typically found in other areas, including heightened stress levels and emotional reactivity among patients and staff alike (Chen *et al*. 2010; Farrell *et al*. 2010; Flannery *et al*. 2011; Jalil *et al*. 2017). A recent meta-analysis of international studies found that nurses working in mental health treatment settings faced approximately three times the odds of physical assault on the job when compared to those working elsewhere (Edward *et al*. 2016).

Phillips' (2016) review of workplace violence literature illuminates multiple elements of the phenomenon meriting consideration. Phillips includes a comparison between risks posed by hospital and non-hospital settings, discusses the impact of underreporting of violent events in health care, and provides an overview of what role national guidelines play in changing hospital practices, all of which contribute to an understanding of the complexity of workplace violence in health care. Phillips points out that there is a wide range of methods used for reporting violence and that there is no consensus on the best tool for tracking. This finding represents an important gap in the workplace violence literature, because without stable measures for comparison, effectiveness of interventions designed to reduce violence cannot be adequately measured. For each clinical setting, multiple tools for defining and reporting assaults are often used simultaneously, and each agency has several layers of organization responsible for evaluating and aggregating information. While differing data requirements from risk managers, hospital administrators, and government agencies will likely persist, a clearer picture of workplace violence rates and types of available reporting practices will assist all entities with a stake in improving worker safety.

The U.S. Occupational Safety and Health Administration (OSHA), the federal agency responsible for maintaining and enforcing safety standards in all industries, defines workplace violence as 'is any act or threat of physical violence, harassment, intimidation, or other threatening disruptive behavior that occurs at the work site' (Occupational Safety & Health Administration, nd). The National Institute for Occupational Safety and Health (NIOSH), the U.S. entity within the Centers for Disease Control and Prevention responsible for occupational health and safety research, defines workplace violence as 'violent acts (including physical assaults and threats of assaults) directed toward persons at work or on duty' (National Institute for Occupational Safety & Health 2014). NIOSH also distinguishes between the four types of workplace violence: Type 1 involves criminal intent (such as a robbery), Type 2 involves customer or client behaviour towards workers (most common in healthcare settings), Type 3 involves worker to worker violence, and Type 4 involves behaviour stemming from personal relationships outside the workplace (National Institute for Occupational Safety & Health 2020).

As an additional note on terminology, researchers have also used 'aggression' to describe the phenomenon of violent or threatening behaviour towards health care and other workers (Iennaco *et al*. 2017; Yragui *et al*. 2017). The American Psychological Association defines aggression as 'behavior aimed at harming others physically or psychologically' (American Psychological Association 2020). The term 'aggression' does not appear in language used by regulators, although the definition of workplace violence also describes aggressive behaviour directed towards workers. Due to the overlapping definitions and because the literature under review employs both terms to describe the single phenomenon of interest, both workplace violence and aggression will be used in this article.

The lack of a centralized health system in the United States introduces challenges to estimating the size of the workforce impacted by violence in the inpatient psychiatric treatment setting. Recent research has combined national surveys of Registered Nurses (RNs) and

credentialing bodies to generate a figure of 120 000–135 000 nurses working in all types of mental health treatment settings throughout the country. Of these nurses, 84% reportedly work in the institutional setting (Phoenix 2019). The U.S. BLS provides a lower estimate, reporting that 40 390 RNs work in the psychiatric or substance abuse hospital setting, although this figure may not capture nurses providing care on a psychiatric unit within a general hospital setting. The U.S. BLS also reports that 30 400 Psychiatric Technicians work in the hospital setting, along with 21 490 workers classified as Psychiatric Aides, a category describing providers who work under the direction of RNs to care for patients. The agency reports that an additional 3310 psychiatrists work in the inpatient psychiatric setting, along with an estimated 10 160 social workers (United States Bureau of Labor Statistics 2020). Additional therapists, housekeepers, clerks, security workers, and other administrative personnel are also part of the healthcare workforce in the inpatient psychiatric setting and may also experience violence on the job.

The purpose of this systematic review of literature is to assess the incidence or prevalence of patients' aggressive or violent behaviour directed towards healthcare staff in the inpatient psychiatric setting in the United States. While other systematic reviews have incorporated findings from international settings and hospitals in general, no systematic review was found that specifically addressed workplace violence for inpatient psychiatric settings in the United States. Although psychiatric settings share characteristics with other high-risk environments like the emergency department, there are unique features based on the patient population, staff behaviours, and frequent necessity for involuntary detainment or treatment. In addition, the United States has high rates of overlap between the mental health treatment system and the criminal justice system, a factor which has the potential to increase aggression in psychiatric hospitals (Wilson & Wood 2014). Data from international settings will provide a useful comparison but are excluded from this review because diagnosis and treatment of mental illness vary by culture, differences which have the potential to impact workplace violence occurrence.

In evaluating available evidence, this review will compare how researchers have chosen to report their findings and consider the implications of these decisions for research consumers. It is important to note that definitions of workplace violence vary by research study, and definitions are not always provided, complicating the assessment of rates of violence. Nonetheless, as this literature develops it will be important to find areas of consensus to move forward with evidence-based approaches to address the issue. As the problem of workplace violence in psychiatric treatment settings persists, stakeholders have begun to implement interventions they hope will increase safety in the environment. However, without improved understanding of the breadth of workplace violence and its measurement in psychiatric settings, it will be difficult to design interventions and measure improvement.

METHODS

Protocol and registration

Moher *et al*. (2009) have provided a standardized approach to structuring systematic reviews in the widely utilized Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA) guidelines, and their approach will be implemented here to lend rigour to searching and evidence evaluation. The goal of using the PRISMA strategy to document and report results of the search is to minimize bias and consequently improve generalizability of findings to appropriate settings. This systematic review was registered in PROSPERO, an international database of prospectively registered systematic reviews in health and social care (Identification number 137436).

Inclusion and exclusion criteria

The population under investigation for this systematic review of literature is the workforce which provides care to patients in the inpatient psychiatric setting. This includes licensed and unlicensed nursing staff, hospital support staff, administrative personnel, social workers, counsellors, and physicians. Because the goal of this review is to establish rates of assault for these workers, there is no intervention under investigation. However, because some researchers have collected workplace violence prevalence data as they evaluate a workplace violence mitigation intervention, studies which evaluate an intervention were not excluded. When these studies were included in the final review, only results collected prior to their interventions were incorporated for final analysis. As there were relatively few studies measuring incidence or prevalence of workplace violence in inpatient psychiatric settings in the United States, this review included all published work before 27 June 2019 available in electronic databases. Inclusion criteria were any research article or report reflecting a primary

study related to workplace violence in an inpatient psychiatric setting. This includes randomized controlled trials, cohort studies, and case–control studies. In addition, secondary analyses of existing data sets were included in this review when authors provided adequate description of their analytic techniques and sample. Because the research question is focused on prevalence and/or incidence, quantitative data are necessary to provide needed information on rates at a single worksite or reporting area. Other inclusion criteria include publication in English and a sample located in the United States.

Studies which did not include findings from at least one inpatient psychiatric setting were excluded, and qualitative investigations were excluded from this review because they do not provide measurable rates of violence. Case reports, editorials, and other systematic reviews or meta-analyses were also excluded from this review. As described above, regulatory agencies have defined multiple categories of workplace violence, each of which reflects a substantial area of research. Type 3 workplace violence, behaviour that occurs between co-workers, is a substantial area of inquiry within health care and especially within nursing. While important, this type of workplace violence is not the focus of this review and research reporting on incidence or prevalence of Type 3 violence is excluded. Although both types of experiences can be defined as workplace violence, strategies for measurement, reporting, and mitigation of these encounters are largely distinct from those aimed at Type 2 violence. Therefore, to improve usefulness of the findings and develop implications of this review, such studies were not included. For similar reasons, studies focused on Type 1 (criminal behaviour) or Type 4 (stemming from non-work relationships) violence were also excluded.

Information sources and search

The databases PUBMED, Web of Science, PsycINFO, CINAHL and EMBASE were searched on 27 June 2019, using a search strategy described in Appendix 1. Multiple search terms were utilized to capture the widest definitions of workplace violence in the inpatient psychiatric setting, including Medical Subject Headings where appropriate. The term workplace violence most accurately describes the phenomenon of interest and has been widely used in the U.S. healthcare context following the publication of the OSHA's *Guidelines for Preventing Workplace Violence for Health Care and Social Service Workers* in 1996 (Occupational Safety & Health Administration 2004). No limits on publication date were set during search, and publication language was limited to English in all five databases.

Study selection

Two reviewers conducted the screening process to determine whether each study was eligible for inclusion. The primary reviewer (RO) is a PhD candidate in nursing, and the secondary reviewer is a graduate student research assistant. First, the reviewers searched each database for relevant records then imported them into review management software, Covidence, where duplicate records were identified. Then, the reviewers evaluated the title and abstract of each remaining study to determine whether any could be eliminated based on the exclusion criteria. Following this level of analysis, the same reviewers evaluated the full text of the remaining studies to determine whether inclusion and exclusion criteria were satisfied in each instance. For disagreements between the reviewers, the primary reviewer determined whether inclusion was appropriate after discussion between the reviewers.

Data collection process

To collect data from each selected study, the primary reviewer created two tables representing the major areas of interest based on the research question. Data were extracted directly to the tables, using a cut and paste function where possible to reduce the possibility of transcription error. To ensure completeness, each study was reviewed at least twice by the primary reviewer.

Data items

Extracted data were summarized in two tables: Descriptive and sample characteristics (Table 1), and Workplace violence measurement (Table 2). For each study, description of the total workforce of the facility was provided, when possible, in addition to sample description to develop understanding of what types of workers were targeted for inclusion among the total population of interest.

RESULTS

Figure 1 provides a visual representation of the selection process as recommended by the PRISMA

statement (Moher *et al*. 2009). Of the total 335 studies retrieved utilizing the search strategies described in the methods section, 265 unique records were found. Of these, 227 were excluded after the reviewers considered each title and abstract. Terms specifying the United States as the geographic area of interest were utilized in Web of Science, CINAHL, and PsycINFO; however, the search returned a significant number of studies with samples located in other countries. In the title and abstract review, 136 were excluded based on reporting non-United States data, and five more were excluded in the full-text review process. In addition, several reflected samples where the study setting was not in the inpatient psychiatric setting. The full text of the 38 remaining articles were reviewed for relevance to the aims of the systematic review. Twenty-four articles were excluded based on the established criteria, resulting in 14 studies for the final synthesis. Reasons for exclusion at this stage are provided in Figure 1. Of the 14 studies, two were found to use identical data sets to other included studies. These records are listed in the evidence tables with notation.

In addition, multiple studies were excluded because they aggregated workplace violence data for the inpatient psychiatric setting with other types of hospital settings such as general medical units or the emergency department, and isolated rates were not available. As described in the inclusion/exclusion criteria, the term workplace violence frequently also refers to lateral violence or bullying behaviour between colleagues, and multiple articles with this primary focus needed to be excluded at the title/abstract review stage. Further, studies which did not reflect a quantitative measurement strategy or inadequately described their methodology were excluded for this review. Multiple authors reported findings of Quality Improvement processes or published expert opinions without substantive methodological support; studies without description of data collection procedures were excluded on the basis of methodology. Full results of data extraction from the 14 included studies are presented in Tables 1 and 2.

Worker and facility characteristics, sample composition (Table 1)

Of the 14 studies, two reflected large data sets from county and state workers' compensation claims, Los Angeles County in California (Sullivan & Yuan 1995), and the states of New Jersey and California (Casteel *et al*. 2009). Three others represented data from large, public hospitals (all of which treat forensic patients) in Washington (Bensley *et al*. 1997), an unspecified location in the U.S. Midwest (Hatch-Maillette *et al*. 2007) and California (Kelly *et al*. 2015). The setting for one study includes Veterans Health Affairs facilities located throughout the United States (Ridenour *et al*. 2015), and two others reflect findings from small, private hospitals with treatment populations of under 100 located in Rochester, New York (Privitera *et al*. 2005) and an unspecified location in New England (Iennaco *et al*. 2017). Staggs' (2015) national data set incorporates reports from 345 hospitals ranging in size and ownership characteristics. Four studies described the total number of staff working in the facility or system, each representing between 400 and 5000 total staff working in a range of mental health treatment capacities (Bensley *et al*. 1997; Privitera *et al*. 2005; Rosenthal *et al*. 2018).

Following from these differences in population of interest, sample sizes for survey respondents ranged from 21 in a small pilot study (Lanza *et al*. 2009) to 802 in a Quality Improvement effort in a large hospital system (Rosenthal *et al*. 2018). When gender was reported for the sample, survey respondents were found to be between 56 and 80% female. Two studies reported findings that were based on samples of between 54 and 66% Registered Nurses (RNs) (Kelly *et al*. 2015; Ridenour *et al*. 2015), while one reflected a sample that was 63% members of non-RN treatment staff such as mental health technicians or other personnel (Bensley *et al*. 1997). For the survey-based studies, response rates ranged from 19 to 56% (Bensley *et al*. 1997; Hatch-Maillette *et al*. 2007; Kelly *et al*. 2015; Privitera *et al*. 2005; Rosenthal *et al*. 2018; Yragui *et al*. 2017). Six studies reported data on respondents' race/ethnicity, ranging from 37% 'Caucasian' for respondents in a large, public forensic institution in California (Kelly *et al*. 2016) to 89% 'White' in a large organization located in the Midwest (Hatch-Maillette *et al*. 2007). Sullivan and Yuan (1995) reported findings related to workers described as 'non-white' or 'race unknown' by the Los Angeles county workers' compensation data management system.

Workplace violence definitions and measurement (Table 2)

Each study included in the review provided a definition or tool to measure workplace violence in their population of interest. For those with a wide, public health perspective, government reporting mechanisms often provide the framework for what constitutes a violent

TABLE 1 *Descriptive, sample characteristics; Workplace violence in U.S. inpatient psychiatric settings* (N = *14*)

Author, Year	Title	Type of study	Setting: Healthcare organization(s), location	Population, Sample size, available sample description, response rate (if provided)
Sullivan, C. & C. Yuan, 1995	Workplace assaults on minority health and mental health care workers in Los Angeles	Retrospective cohort	Los Angeles County Departments of Health Services and Mental Health	Population: 80 000 total county employees (1990); 60–70% ethnic minority Sample: 628 verified assaults on 530 workers; Identified as 'minority'
Bensley, L., *et al.* 1997	Injuries due to assaults on psychiatric hospital employees in Washington state	Retrospective cohort, cross-sectional	Washington State Psych Hospital including: Adult Psychiatric Unit: 149 beds, Geriatric/Medical Unit: 130 beds, and Legal Offenders Unit: 83 beds, total: 362 beds. Average daily census 349	Population: 435 treatment staff: 226 mental health technicians (of whom 41% were licensed practical nurses); 122 RN; and 87 from other disciplines Sample: *N* = 147 survey respondents; 37% RN Response rate: 56%
Privitera, M., *et al.* 2005	Violence towards mental health staff and safety in the work environment	Cross-sectional	University of Rochester Department of Psychiatry: acute hospital of 66 adult beds, 25 child and adolescent beds	Population: 742 total staff approached including clinicians (providing direct patient care) and non-clinicians (such as administrative/support staff) Sample: *N* = 380 respondents; 80% female; 69% clinical staff, 40% greater than 10 years employment at facility Response rate: 51%
Hatch-Maillette, M.A., *et al.* 2007	A Gender-Based Incidence Study of Workplace Violence in Psychiatric and Forensic Settings	Cross-sectional	Site one: a midwestern state psychiatric facility with forensic, long-term and acute care units; Site two: community-based dual-diagnosis treatment facility	328 eligible staff including psychiatrists, psychologists, nurses, social workers, therapists, psychiatric technicians, case managers *N* = 129 survey respondents; 60% female; 89% White; 15% nurses, 42% technicians Response rates: 39% outpatient/dual-diagnosis, 40% state hospital
Casteel, C., *et al.* 2009	Hospital Employee Assault Rates Before and After Enactment of the California Hospital Safety and Security Act	Retrospective cohort	Emergency department and psychiatric units of trauma and general acute care hospitals in California and New Jersey counties with at least 250 000 residents	Sample: 35 psychiatric hospital units in California, 26 psychiatric hospital units in New Jersey Response rate: Of all eligible hospitals approached, participation rate 93% among California hospitals and 65% among New Jersey hospitals
Lanza, M. *et al.* 2009	Reducing Violence Against Nurses: The Violence Prevention Community Meeting	Prospective cohort study (pilot)	A single Veterans Health Affairs acute inpatient psychiatry unit; average census = 30 patients, average length of stay (LOS): 5 days	Sample: *N* = 21 nursing staff; 13 female, 8 male; including 9 RNs, 3 Licensed Practical Nurses, 9 psychiatric nursing assistants
Ridenour, M., *et al.* 2015	Incidence and risk factors of workplace violence on psychiatric staff	Prospective cohort study	All Veterans Health Affairs (VHA) inpatient acute psychiatric hospitals invited, no specific information about number of total facilities	Sample: *N* = 284 nurses working in 8 VHA hospitals; 70% female; 37% white, 41% black; 54% RN, 35% nursing assistant, 9% Licensed Practical Nurse
Lanza, M. *et al.* 2016 (same data set as Ridenour, M. 2015)	The Violence Prevention Community Meeting: A Multi-Site Study		Inpatient psychiatric unit where average patient census = 30, average LOS = 5 days	Response rate: 'At least' 80%

(*Continued*)

TABLE 1 (Continued)

Author, Year	Title	Type of study	Setting: Healthcare organization(s), location	Population, Sample size, available sample description, response rate (if provided)
Kelly, E. L., *et al*. 2015 Kelly, E.L. *et al*, 2016 (same data set as Kelly, E.L. *et al*, 2015)	A cross-sectional survey of factors related to inpatient assault of staff in a forensic psychiatric hospital Well-Being and Safety Among Inpatient Psychiatric Staff: The Impact of Conflict, Assault, and Stress Reactivity	Cross-sectional (online survey)	One forensic psychiatric hospital in California with 1287 beds but treatment population of 1500; majority judicial commitments	Population: 1794 total clinical staff including psychiatric technician, RN, supervisor, rehabilitation therapist, psychologist, social worker, psychiatrist Sample: *N* = 348 survey respondents; 69% women; 37% 'Caucasian', 21% African American, 21% Hispanic, 11% Asian American and 10% mixed race or other; 66% RN; average time in mental health 14.4 years Response rate: 19%
Staggs, V.S. 2015	Trends, Victims, and Injuries in Injurious Patient Assaults on Adult, Geriatric, and Child/Adolescent Psychiatric Units in US Hospitals, 2007–2013	Retrospective cohort study	U.S. hospitals which participate in the National Database of Nursing Quality Indicators	Sample: 345 hospitals (324 general, 5 paediatric, 16 psychiatric); 618 psychiatric units (438 adult, 75 geriatric, 105 child/adolescent); 63.5% teaching hospitals, 62.6% 300 or more beds; 78.8% non-profits All hospital employee classifications included
Yragui, N.L. *et al*, 2017	Linking Workplace Aggression to Employee Well-Being and Work: The Moderating Role of Family-Supportive Supervisor Behaviors (FSSB)	Cross-sectional (paper or online survey)	Two public psychiatric hospitals in the Northwestern U.S., both in same healthcare system. Hospital 1 had 806 beds, Hospital 2 had 287 beds	Sample: *N* (total) = 417 respondents; *N* (hospital 1) = 257, *N* (hospital 2) = 160 *N* (total) =56.5% female; 63.3% White; Respondents without direct patient contact were excluded Response rate (total) = 41.3%
Iennaco, J. D., *et al*. 2017	Aggressive Event Incidence using the Staff Observation of Aggression Scale-Revised (SOAS-R): A Longitudinal Study	Prospective cohort study	One inpatient hospital in Northeastern United States, 4 acute psychiatric units (2 adult, 1 geropsychiatric, 1 child/adolescent)	Sample: *N* = 113 events
Rosenthal, L.J. *et al*, 2018	Impact and Prevalence of Physical and Verbal Violence Toward Healthcare Workers	Cross-sectional (online survey)	Northwestern Memorial Hospital, 894-bed tertiary care, urban, academic medical centre; 86 300 emergency room presentations and 69 400 observation or inpatient admissions in 2016	Population: Email distribution lists included approx. 5232 physicians, nurse practitioners/physician assistants, nurses, social workers, Certified Nursing Assistants Sample: *N* = 802; Demographics: 78.8% female; 72.9% White, 8.1% Black, 4.5% Latino, 11.5% Asian; Professional role: 54.2% clinical nurse, 20% physician; 5% (*N* = 40) respondents in psychiatry department Response rate: 19%

event. Casteel *et al*. provide their definition as 'physical or psychological acts perpetrated against a hospital worker by a patient, visitor, employee, domestic acquaintance, and/or stranger' (Casteel *et al*. 2009, p. 127). For these larger studies with administrative data sources, rates of violence in these studies are reported as rate per 100 full-time equivalent employees, or per 100 000 employee hours/year (Bensley *et al*. 1997; Casteel *et al*. 2009; Sullivan & Yuan 1995). Researchers with a closer level of contact with the treatment setting have chosen other definitions of workplace violence and have reported their findings using the Modified Overt Aggression Scale (Ridenour *et al*. 2015) or the Staff Observed Aggression Scale-Revised (Iennaco *et al*. 2017), both of which allow staff to rank the severity of experiences. Only Ridenour *et al*. (2015) in their study investigating violence in Veterans Health Affairs settings, asked nurses to report findings immediately, collecting forms at the end of each shift during the length of the study.

Use of other types of administrative data sources results in alternative workplace violence measurement strategies, using either workers' exposure time or patient volume as the basis for comparison. For the workers' compensation data, researchers found that there were 2-7 claims due to assault per 100 000 employee hours each year (Bensley *et al*. 1997; Casteel *et al*. 2009). Only Bensley *et al*. (1997) included records from hospital administration, finding that assaults were significantly higher, ~17 assaults per 100 000 employee hours each year. Using analysis based on National Database of Nursing Quality Indicators reports, Staggs (2015) reported findings based on the number of patient days for the unit in the month of reporting, finding that assaults ranged from a low of 2.3 assaults/10 000 patient days in adult units to 12.5 assaults/10 000 patient days in child/adolescent units.

Multiple researchers chose to rely on information provided to them directly by workers themselves. When considering survey data, 25–85% of workers reported that they had experienced an episode of physical aggression during the past year (Kelly *et al*. 2015; Privitera *et al*. 2005; Ridenour *et al*. 2015). In several more detailed surveys, 45.5% of staff sampled reported experiencing a moderate injury due to patient assault during their tenure at their current job (Bensley *et al*. 1997), and 12% of another sample stated that they had taken at least one day off work following an assault during the prior six months (Kelly *et al*. 2015). Only Ridenour *et al*. (2015) collected incidence data, reporting that there were 0.68 violent encounters per nurse in the equivalent of a 40-hour workweek during the time of data collection.

Only two studies identified theoretical frameworks to guide inform their findings. Kelly *et al*. (2015) utilized the Person-Environment Fit theory which addresses how workers may be psychologically impacted by their work in a setting where they are likely to experience violence, also proposing that frequent violent encounters at work may potentially result from staff members' personality traits. While this theory did not overtly direct data collection capturing prevalence of violence, the authors did include questions about workers' experiences with co-workers and family members to attempt to measure the individual's approach to conflict more generally. Yragui *et al*. (2017) described ways the Conservation of Resources Theory and Social Exchange Theory informed their understanding of workplace violence in healthcare settings and provided context for how employees might encounter these experiences in the course of their work.

Study design and limitations identified by authors

Study design is described in Table 1, and limitations identified by their authors are summarized in Table 2. Studies in this review were designed as retrospective cohort ($n = 4$), prospective cohort ($n = 3$), or cross-sectional ($n = 6$) based on their research questions and available data. One study (Bensley *et al*. 1997) used both a retrospective cohort component and a cross-sectional component. For Sullivan and Yuan (1995), Casteel *et al*. (2009), and Staggs (2015), inquiries into the prevalence of violence reported to government agencies or a national database were approached using a retrospective design. Sullivan and Yuan (1995) point out that this method relies on accurate coding by multiple layers of organization, which could impact findings. Casteel *et al*. (2009) state that one important limitation of their results is that their data likely underreport assault findings because they are only capturing days of work missed due to injury. In addition, Staggs points out that hospitals choosing to participate in the data collection process are not a random sample of the national population of psychiatric units.

Taking a smaller-scale approach to measuring the problem by focusing on one or several workplaces, Bensley *et al*. (1997), Privitera *et al*. (2005), Kelly *et al*. (2015), Yragui *et al*. (2017) and Rosenthal *et al*. (2018) all deployed surveys to collect data, necessitating a

TABLE 2 *Findings; Workplace Violence measurement in inpatient U.S. psychiatric settings* (N = *14*)

Author, Year	Workplace violence definition	How incidents were reported	Assault rates	Risk factors identified	Limitations identified by author
Sullivan, C. and C. Yuan, 1995 Bensley, L., *et al.* 1997	Assault: 'intentional physical injury to a health care worker by another individual' Survey: Six questions with ratings for severity and frequency of physical assault Workers compensation data analysed by researchers No definition provided for hospital-based incident data	Workers compensation claim report data, employees' lost time Workers compensation claims, hospital incident reports, anonymous worker survey reporting on past year's experience on the job	185.4 assaults per 1 000 000 employment days in psychiatric setting Workers compensation: 13.8 claims due to assaults per 100 FTEs; Hospital records: 35.3 assaults per 100 FTEs; Survey (past year/entire employment period): 3.5/2.8% none; 11.2/6.3% threatened; 12.6/10.5% physical contact; 25.2/13.3% mild injury; 38.5/45.5% moderate injury; 7.7/16.8% severe injury; and 1.4/4.9% disabling injury	45% assaults in psychiatric setting occurred while restraining patient Working in isolation, working as a mental health technician (instead of other types of job descriptions)	Misclassification of data due to initial data collection for other purposes Possible disincentives to reporting may limit internal hospital measurement, recall bias or selection bias may impact survey responses
Privitera, M., *et al.* 2005	A 'threat' is an expression to inflict pain, injury, or other harm. The expression may be verbal or nonverbal. The threat of harm may be explicit or implied. An 'assault' is a physical contact that results in injury. 'Sense of safety' was also measured on 0-7 point scale	Anonymous survey mailed to staff	43% of respondents reported threats; 25% of all respondents experienced assaults (34% of clinicians and 8% of non-clinicians)	Work experience is moderately protective, direct patient care is higher risk group	Selection bias, anonymity makes it difficult to describe non-responders; recall bias is likely for events further in the past
Hatch-Maillette, M.A., *et al.* 2007	'Threaten: a patient/client telling you that he might hurt you or doing things that made you think he might hurt you Sexually threaten: a patient/client telling you that he could do sexual things to you or doing things that made you think he would sexually hurt you Assault: A patient/client pushed you, hit you, or caused you physical pain'	Open-ended questions asking staff to describe their history of ever being physically or sexually assaulted or threatened and whether they reported the event; participants asked to rate incident on severity scale Paper form completed during team meetings arranged by manager; option provided to submit via sealed envelope	54% reported incident within past year; 69% within the past 6 months; 85% of staff were not physically injured. 66% reported having ever been physically or sexually assaulted by a patient	Women reported experiencing more sexual threats; women experienced more threats overall than men; nurses and technicians reported experiencing more threats and feeling less safe than other types of clinical staff	Employees with the most traumatic experiences may have left their job as a result and are, therefore, not sampled; questionnaire asking about feelings of safety overall prior to specific incidents may have primed respondents to leave out unsafe incidents from report; potential recall bias; clinical vignettes may not be generalizable

(*Continued*)

TABLE 2 (Continued)

Author, Year	Workplace violence definition	How incidents were reported	Assault rates	Risk factors identified	Limitations identified by author
Casteel, C., *et al.* 2009	Violent events were defined as physical or psychological (e.g. verbal assaults) acts perpetrated against a hospital worker by a patient, visitor, employee, domestic acquaintance, and/or stranger	OSHA-recorded violent injuries per 100 000 employee hours per year for the years 1993–2001; employers' records of occupational injuries	In California, the assault rate increased from 2.06 assaults (per 100 000 employee hours per year) to 2.31 assaults, whereas in New Jersey, the assault rates increased from 0.42 to 1.09 assaults in the pre- and post-legislation periods	Violence prevention legislation did not appear to lower assault rates in psychiatric hospital settings; rates did decrease in emergency departments	Unable to measure hospital compliance with the legislative mandates, assume underreporting (author's impact study showed up to 50% staff did not report incidents), only severe incidents reported because OSHA logs capture days missed due to injury
Lanza, M. *et al* 2009	Overt Aggression Scale; violence defined as 'any verbal or physical behavior resulting in, or intended to result in, physical or psychological injury, pain, or harm'.	Nursing staff carried a small event recorder to capture count of events in real-time; staff completed log at the end of each shift to provide details of events during that day	Mean pre-intervention number of violent events per nurse (during approximately 120 work hours) = 4.79 (1.2 sd); averaged across all day/evening/night shifts	Culture of non-violence explored as reason for decrease in aggression during study period	No data collected regarding reliability of staff coding of patient violence
Ridenour, M., *et al.* 2015 Lanza, M., *et al* 2016 (same data set as Ridenour, M. 2015)	Modified Overt Aggression Scale criteria rating verbal aggression, physical aggression and property destruction on a 0-5 scale	For 'previous 30 days' data survey was used; For ongoing data collection of new incidents nurses completed MOAS evaluation at the end of each shift	85.2% reported at least one assault in prior 30 days During intervention: .68 incidents per nurse in equivalent of 40-hour workweek	For physical aggression, personality disorders were identified as risk factor; evening shift had highest rates of overall assaults	Requirements to maintain privacy limit data collection, lack of statistical significance in risk factors
Kelly, E. L., *et al.* 2015 Kelly, E.L., *et al.*, 2016 (same data set as Kelly, E.L. et al, 2015)	Physical assault: 8-item measure developed for study with Likert scale to rate severity Other conflicts: Psychiatric Nurse Stress Inventory (5-point scale for multiple types of encounters)	Online survey; staff reported frequency and severity ratings of assaults over the past year	70% reported >1 physical assault during the previous year. 42% reported >1 incident of non-sexual serious assault (kicked, punched, slapped, hit in the head, pushed or knocked down). 64% >1 mild assault (e.g. being grabbed, touched or spat on). 12% reported taking at least 1 day off due to assault during past 6 months.	Male respondents reported more assaults; ward staff (as opposed to clinical or supervisory staff) more assaults; patient-staff conflict identified as risk factor	Cross-sectional design limits causal conclusions; sample includes one hospital only; study design focused on staff factors instead of patient factors; selection bias due to voluntary survey responses

(*Continued*)

TABLE 2 (Continued)

Author, Year	Workplace violence definition	How incidents were reported	Assault rates	Risk factors identified	Limitations identified by author
Staggs, V.S. 2015	National Database of Nursing Quality Indicators (NDNQI) definition: any unwanted physical or sexual contact by a patient, regardless of intent to harm	Data reported monthly by hospital to NDNQI: number of injurious assaults, unit's number of inpatient days, victim classification, injury severity classification	2.3 assaults against staff per 10 000 patient days in adult units, 12.0 in geriatric units, 12.5 in child/adolescent units	RNs most frequently injured person (32.1%), nursing staff combined accounted for 64.9% of most severely injured victims; rate 5x as high on geriatric units as adult units	Non-random study sample, only adult sample is really 'nation-wide' with 46 of 50 states contributing data; potential for underreporting
Yragui, N.L. *et al*, 2017	Not provided	Participants completed surveys during work hours in hospital conference rooms; Single survey question asking when participant experienced physical assault from patient in past 2 years	Mean number of reported assaults = 0.57 (standard deviation = 0.50)	Family-supportive supervisor behavior was a mediator for patient physical aggression and co-worker psychological aggression in work-related outcomes	Self-report measures, cross-sectional design; single measure to report incidents of violence
Iennaco, J. D., *et al*. 2017	Staff Observation Aggression Scale – Revised: defines aggression as "any verbal, nonverbal, or physical behavior that was threatening," or "physical behavior that actually did harm;" results are combined in total score 0-22	Clinical staff (nursing and other professional staff) completed paper forms	113 events, 13.27 per bed per year; 43% verbal only, 57% physical aggression	Higher rates of aggression on adolescent unit, more staff-directed aggression on geriatric unit; 47% of incidents had no apparent provocation	Likely underreporting particularly of verbal aggression, change in reporting criteria over length of study period
Rosenthal, L.J. *et al* 2018	National Institute for Occupational Safety and Health: the act or threat of violence, ranging from verbal abuse to physical assaults, directed towards persons at work or on duty	18-question online survey with questions about physical or verbal assault and its impact	[Of 40 respondents from psychiatry department] 47.5% reported any assault within the past year (1.83 mean incidents/person); 7.5% reported physical assault (0.08 mean incidents/person); 47.5% reported verbal incidents (1.55 mean incidents/person)	Emergency medicine department reported much higher percentages; higher rates of reported violence among newer employees	Response bias: authors assume that actual rates may be lower than reported; single institution so generalizability may be limited

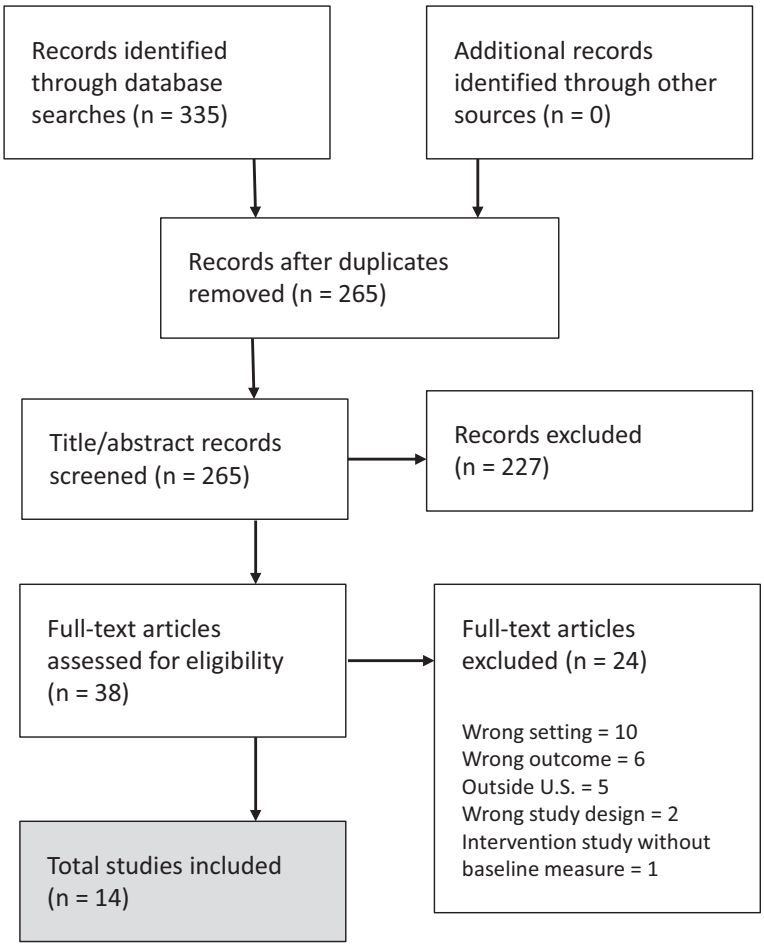

FIG. 1 Flow diagram for study selection.

cross-sectional design. While the authors all point out that there are benefits to providing workers anonymity when discussing the potentially sensitive issue of workers' experiences of violence on the job, they each acknowledge that their findings may be impacted by selection bias and recall bias, particularly when asking workers about events that happened long ago. Kelly *et al*. (2015) and Rosenthal *et al*. (2018) further state that generalizability may be limited by the fact that findings were collected at a single facility.

In order to achieve greater control over the measurement of workplace violence and limit the effects of recall bias, Ridenour *et al*. (2015) and Iennaco *et al*. (2017) used prospective cohort design, capturing reports of episodes of violence over time following study initiation. Findings from these studies were collected during larger intervention studies, making the prospective approach more appropriate to the larger question of interest for each group of researchers. For Ridenour *et al*. (2015), incidence of violence data was gathered during the implementation of the Violence Prevention Community Meeting and reflected a period of 21 weeks at each site. Iennaco *et al*. (2017) provided minimal detail about their larger longitudinal project, reporting that they collected data over a period of six weeks at a single site. Ridenour *et al*. (2015) identified their limitations as failing to find significance in risk factors and difficulty in researching individual incidents due to privacy mandates. Iennaco *et al*. (2017) identified a possible limitation linked to research design, pointing out that respondents may have changed their reporting practices over the course of the study, compromising reliability and validity of research findings.

DISCUSSION

The purpose of this systematic review is to assess the extent of patients' violent or aggressive behaviour

towards healthcare workers in the inpatient psychiatric setting in the United States, incorporating research findings that utilized measures of either prevalence or incidence. To accomplish this aim, five databases were searched and a total of 14 full-text articles were included once inclusion and exclusion criteria were applied. Statewide-level data indicate that assaults occur at a rate of between 2 and 7 per 100 000 employee hours per year, and survey data show that 25–85% of workers had experienced an incident of violence during the past year. While these findings do not provide much specificity for understanding how often workplace violence occurs in the inpatient psychiatric setting, they do provide support for the widespread belief that such encounters happen frequently, and rates are high in a range of treatment settings from small private units to large forensic facilities.

These findings are generally aligned with what other healthcare researchers have found when using surveys and government data to study workplace violence in both United States and international settings. Gerberich *et al*. (2004) Minnesota Nurses' Study provides an estimate of prevalence of physical and non-physical violence for nurses throughout the state, although the authors do not provide specific estimates based on work setting. These researchers calculated an annual adjusted rate of physical assault of 13.2 events per 100 full-time employees and 38.8 incidents of non-physical violence per 100 workers. In a survey of U.S. emergency department physicians, researchers found that 75% of respondents had experienced verbal aggression in the past year and 28% had been victims of physical assault on the job (Kowalenko *et al*. 2005). A large survey of providers working in mental health treatment wards in the United Kingdom found that 78% of nursing staff had experienced aggression or threats at work (Chaplin *et al*. 2006). An additional study with a United Kingdom-based sample found that 76% of psychiatric nursing staff had experienced at least mild physical violence and 22% had taken days off of work due to workplace violence during the past year (Nijman *et al*. 2005).

In Taiwan, researchers reported a rate of 2.3 incidents of physical violence per staff member in a year's work, based on a web-based reporting survey of 74 nursing staff members (Chen *et al*. 2011). A recent meta-analysis representing over 80 000 Chinese healthcare workers across multiple settings found an overall prevalence of 62% for reported violence during the past year's work. Notably, while emergency department workers in the review were found to be at the highest risk, psychiatric treatment settings were not specifically addressed in the researchers' findings (Lu *et al*. 2018). While it seems important to consider the unique features of the inpatient psychiatric setting in the United States, including its frequent overlap with the criminal justice system and rates of involuntary commitment (Lamb & Weinberger 2017; Wilson & Wood 2014), further investigation is needed to compare rates of workplace violence in the United States to occurrences reported in other countries. Based on these initial findings, it seems likely that there are significant similarities in frequency of workplace violence across international borders, despite cultural differences in health and judicial system structures.

For outpatient and community healthcare workers, workplace violence is also a significant hazard. Flannery *et al*. have reported extensively on data collected through a crisis-response program (the Assaulted Staff Action Program, or ASAP) across multiple decades in Massachusetts, U.S., and have included a comparison between reports of violence towards staff in inpatient and community settings. The authors found that from 1994 to 2010, ASAP responded to 2566 assaults, 78% of which occurred in the inpatient setting and 22% in outpatient (Flannery *et al*. 2011), inclusive of both physical and verbal encounters. Konttila *et al*. (2018) recently published a systematic review aggregating findings from outpatient mental health treatment settings in five countries, finding that workplace violence is a common occurrence for community workers worldwide, with verbal and threatening behaviour being the most widely reported concern. As the authors point out, outpatient settings are an important area for continued workplace safety research as current health services industry trends move care delivery from the hospital to the community, even while patient acuity may remain unchanged.

The studies included in this review describe a range of possible risk factors for facing violence on the job, including gender, job function, years of work experience, and patient diagnosis (Table 2). Broadly, researchers have confirmed that workers who spend the most time providing direct care to patients in the inpatient psychiatric setting are most likely to experience workplace violence. Sullivan and Yuan (1995) focused their inquiry on non-white workers in Los Angeles County, California, pointing out that ~60–70% of the workforce were members of a non-white racial/ethnic group. The authors did not make any particular claim about the links between racial/ethnic identity and likelihood of victimization on the job in their sample;

other authors who included racial/ethnic characteristics of their sample also made no such claims, and these data are provided in Table 2 solely to provide additional description of the psychiatric treatment workforce under investigation. Hatch-Maillette *et al*. (2007) used the lens of gender to explore violence towards psychiatric treatment providers, finding that women reported more threats (particularly sexual threats) than men, while Kelly *et al*. (2015) found in a sample consisting of forensic healthcare workers that men experienced more physical violence than women.

A thorough assessment of the risk factors for workplace violence is beyond the scope of this review, but for those working on mitigation efforts, it is useful to consider some of areas of investigation relevant to the inpatient psychiatric setting. In particular, the treatment environment and its impact on patients and staff alike may be important to consider when strategizing for approaches to violence reduction. Researchers using a United Kingdom-based sample found that almost a third of incidents involving aggressive behaviour stemmed from denying patients a request, such as a leave pass from the hospital ward (Foster *et al*. 2007). Enforcing limits can pose risks for workers and can lead to frustration for those on the front line if they are required to adhere to policies that they may not fully endorse and may have little recourse to change practices. In addition, as researchers in the U.S. Veterans' Affairs Healthcare System found, broader frustration with the institutional environment or perceived failures to meet the needs of patients and staff alike can contribute to volatility, anger, and aggressive behaviour (Purcell *et al*. 2017). The inpatient psychiatric setting introduces multiple sources of stress for patients and staff alike, and the interaction of the physical environment, institutional, and legal rules governing behaviour, and resulting stresses for all involved should be considered when engaging in reform efforts.

SUMMARY ASSESSMENT OF STUDY STRENGTHS AND WEAKNESSES

Several study designs included in this review are particularly suited to representing the complex features of measuring workplace violence in psychiatric treatment settings. Specifically, Bensley *et al*.'s (1997) decision to incorporate multiple types of data in their approach strengthens their ability to draw conclusions and enhances the findings from a cross-sectional design alone. Their identification of the need to corroborate findings from one type of data set with findings from another is insightful, particularly considering the early year of its publication in comparison with the other included studies. In addition, Ridenour *et al*.'s (2015) and Lanza *et al*.'s (2009) contributions from data collected at Veterans' Affairs treatment facilities are unique in their approach to carefully measuring incidence data, providing an important counterpoint to cross-sectional findings. Their approach to data collection is certainly time and labour-intensive, but considering the goal of measuring the impact of a violence prevention intervention, necessary for their research questions.

For cross-sectional approaches, Kelly *et al*.'s (2015) survey of California State Hospital workers and Privitera *et al*.'s (2005) survey of a large hospital workforce in Rochester, New York were strengthened by large sample sizes and discussion of the impact of events on impacted employees. The value of these approaches is that workers are provided time to reflect on experiences and consider how violence may have negatively changed their work or family life. While smaller cross-sectional surveys also contribute to the assessment of prevalence of workplace violence in the United States, there are also increasing limitations as the impact of selection and recall bias may be further amplified by decreasing sample size, leading to less robust conclusions from the reported data. In addition, Yragui *et al*. (2017) did not provide a definition of workplace violence, which, given the multiple available constructs used to describe the phenomenon, could result in ambiguity in development of data collection approaches.

Measurement strategies

The studies included in this review of literature represent a range of approaches to determining and reporting rates of violence in the psychiatric setting. Generally, there is no single definition of workplace violence which is shared among researchers, although there are certain shared concepts among measurement strategies. In part, the decision regarding which instrument to employ stems from the researcher's approach to the topic, but also reveals the challenge in accurately recording and reporting incidents of workplace violence. While the decision to utilize state workers' compensation data is straightforward due to standardized definitions of violence provided by OSHA, the validity of results is potentially poor. As Casteel *et al*. (2009) point out, researchers estimated that up to 50% of staff did not report incidents through official channels, so state or federal-level data may do little to illuminate

the scope of the problem. Other researchers have investigated the role underreporting plays in preventing accurate estimates of this phenomenon, finding that 90% of workplaces did not comply with federally mandated requirements for reporting injuries due to inadequate recordkeeping or internal procedures (Wuellner & Bonauto 2014). Recent qualitative research has found that inconsistencies in reporting guidelines, normalization of violence, and challenges with reporting procedures have all contributed to the underreporting of violence in healthcare settings (Morphet *et al*. 2019). An additional, survey-based investigation found that fear of job loss and belief that reporting would do little to ameliorate the problem are also contributing factors (Kvas & Seljak 2014). These deficits have profound implications for determining the scope of the problem and demonstrate the need for more locally based approaches to data collection that introduce fewer barriers to filing a report.

Authors who chose to gather data directly from workers using surveys employed several tools to structure reporting, including the Modified Overt Aggression Scale, the Staff Observation Aggression Scale – Revised, the Psychiatric Nurse Stress Inventory, and other Likert-scale response inquiries to inform questionnaire development. These approaches certainly erect fewer obstacles to filing a report than using official channels like workers' compensation claims; however, voluntary surveys introduce possible selection and recall bias into results, making it difficult to draw conclusions from reported findings. Ridenour *et al*.'s (2015) approach to measurement, while labour-intensive, is likely the most valid of the included studies because workers completed reports following every shift over the 21-week study period. The authors' findings were also significantly higher than those in other included studies, which may be related to the high-risk Veterans Health Affairs setting, but also is likely a result of the greater sensitivity of their design. For comparison, calculating the assault rate based on Ridenour *et al*.'s (2015) incidence data would result in a rate of 1700 assaults per 100 000 employee hours, compared to the statewide data published in Casteel *et al*. (2009) of 2.31 assaults that resulted in days off work per 100 000 employee hours in California.

Strengths and limitations of this review

The strength of this review is that it brings together studies of workplace violence in the inpatient psychiatric setting in the United States using a systematic process, a project which has not yet been previously published. Use of the PRISMA guidelines to facilitate article inclusion and exclusion provides clear description of the development of the final product and minimizes bias in selection of evidence. In addition, the comparison of different measurement strategies for reporting workplace violence allows readers to consider strengths and weaknesses of different approaches. This review has several limitations. First, it was completed largely by a single reviewer, introducing a risk for bias which is greater than when the process involves a team of reviewers. Second, this review includes English language publications only which may have resulted in elimination of otherwise relevant articles. Also, the review included only five databases and no additional manual searching due to time and resource constraints, which may have further limited findings. Due to the limited number of articles resulting from the search, it is difficult to draw firm conclusions. Further, it was not feasible to arrive at a single estimate of prevalence for workplace violence in inpatient psychiatric settings in the United States due to the diversity of measurement strategies and relatively few studies included.

Implications for future research

As this systematic review demonstrates, there are multiple challenges and a diversity of approaches to accurately measuring the extent of violence towards healthcare workers in the psychiatric treatment setting and in other healthcare settings. In California, Senate Bill 1299, the Workplace Violence in Healthcare Prevention standard, includes a new reporting requirement for the state's hospitals that is unique among national legislation. The law requires that acute care and psychiatric hospitals report incidents of violence towards staff within 72 hours of the occurrence to the California Occupational Safety and Health Administration (CalOSHA) through and online reporting portal. This new reporting channel provides an additional point of access to understand the epidemiology of workplace violence in psychiatric settings as well as other hospital locations. While it may face similar challenges to validity as those described by researchers employing other administrative data sources, it also has some unique attributes which may connect reporting more closely to the lived experiences of healthcare workers, particularly as technological advances lower

the barriers to reporting by frontline staff. As the early results submitted pursuant to this reporting requirement are collected and analysed, it is important to contextualize them within the existing literature on this topic. Further, it will be important to consider the process of implementing the reporting requirement within the state's hospitals to better understand the contextual factors contributing to a facility's or an individual's decision to report an incident using the CalOSHA portal or another available channel.

CONCLUSION

The goal of this systematic review is to describe the attributes of a phenomenon that has significant consequences for the provision of mental healthcare in the United States and internationally. As the problem of workplace violence receives increasing attention from healthcare leaders and policymakers, there is an impulse to act quickly. In cases where initiatives are developed, they must be informed by research and rigorously evaluated. To do that, the quality of measurement strategies must be considered, with specific attention to how bias may be introduced at each level of reporting, whether at the individual, unit, hospital, county, state, or federal level. To improve overall validity of findings, the phenomenon of underreporting should be more fully described and explored in future research in the psychiatric setting. Reliable and valid instruments that record incidents on a daily or shift-by-shift basis should be more fully investigated so that experiences can be captured in real-time where possible and problems more efficiently addressed.

RELEVANCE FOR CLINICAL PRACTICE

Workplace violence in healthcare settings has been a recognized hazard for decades, and its seeming intractability has led many nurses and other providers to conclude that it's just 'part of the job'. For those working in the inpatient psychiatric treatment setting, the high rates of such experiences reported by researchers included in this review are unlikely to be surprising. What may be most useful from this review is the recognition that definitions of workplace violence and measurement tools are not standardized, which makes it difficult to compare experiences across settings and determine efficacy of mitigation efforts. Those working on the frontline, management, organizational, regulatory, or legislative levels must approach their measurement strategies thoughtfully and should investigate how they can detect real improvements in workplace safety. While labour-intensive, real-time measurement approaches may be the most accurate and may yield the most actionable information when compared to surveys recording a prior year's information. As research in this area continues, particularly for those interested in making improvements in high-risk locations like the emergency department and psychiatric treatment settings, discussion of valid and reliable measurement strategies must be part of reform efforts.

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ETHICS APPROVAL AND INFORMED CONSENT

Work for this study was performed at the University of California San Francisco. Ethics/informed consent not applicable.

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APPENDIX 1: Search strategies (Final strategy in grey shaded box)

Date of Search: 6/27/19
PUBMED , publication date not restricted

#	Searches	Results
1	((("Workplace Violence/classification"[Mesh] OR "Workplace Violence/economics"[Mesh] OR "Workplace Violence/epidemiology"[Mesh] OR "Workplace Violence/ethics"[Mesh] OR "Workplace Violence/ethnology"[Mesh] OR "Workplace Violence/history"[Mesh] OR "Workplace Violence/legislation and jurisprudence"[Mesh] OR "Workplace Violence/organization and administration"[Mesh] OR "Workplace Violence/prevention and control"[Mesh] OR "Workplace Violence/psychology"[Mesh] OR "Workplace Violence/statistics and numerical data"[Mesh] OR "Workplace Violence/therapy"[Mesh] OR "Workplace Violence/trends"[Mesh]))) AND ("psychiatr*" OR "mental health") Filters: English	80
2	("workplace violence"[Title/Abstract]) AND "healthcare"[Title/Abstract] Filters: English	155
3	("workplace violence"[Title/Abstract]) AND ("psychiatr*"[Title/Abstract] OR "mental health"[Title/Abstract]) Filters: English	109
4	(((((("workplace violence"[Title/Abstract]) AND ("psychiatr*"[Title/Abstract] OR "mental health"[Title/Abstract]))) AND English[lang])) OR ((((((("Workplace Violence/classification"[Mesh] OR "Workplace Violence/economics"[Mesh] OR "Workplace Violence/epidemiology"[Mesh] OR "Workplace Violence/ethics"[Mesh] OR "Workplace Violence/ethnology"[Mesh] OR "Workplace Violence/history"[Mesh] OR "Workplace Violence/legislation and jurisprudence"[Mesh] OR "Workplace Violence/organization and administration"[Mesh] OR "Workplace Violence/prevention and control"[Mesh] OR "Workplace Violence/psychology"[Mesh] OR "Workplace Violence/statistics and numerical data"[Mesh] OR "Workplace Violence/therapy"[Mesh] OR "Workplace Violence/trends"[Mesh]))) AND ("psychiatr*" OR "mental health"))) AND English[lang]) Filters: English	156

Date of Search: 6/27/19
Web of Science, publication date not restricted

#	Searches	Results
1	(ts=(mental health OR psychiatr* OR behavioral health)) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years	338,176
2	(ts=(hospital OR healthcare OR nurs*)) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years	895,944
3	TOPIC: (workplace violence) Refined by: COUNTRIES/REGIONS: (USA) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All year	1001
4	#2 AND #3 Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years	312
5	#1 AND #4 Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All year	74

Date of Search: 6/27/19
EMBASE, publication date not restricted

#	Searches	Results
1	'workplace violence'/exp AND ('mental health' OR 'psychiatr*') AND [english]/lim	23

Date of Search: 6/27/19
CINAHL, publication date not restricted

#	Searches	Results
1	workplace violence AND (hospital or acute setting or inpatient or ward) AND (mental health or mental illness or mental disorder or psychiatric illness)	49
	Narrow by SubjectGeographic: - usa	
	Narrow by Language: - english	
	Search modes - Boolean/Phrase	

Date of Search: 6/27/19
PsycINFO, publication date not restricted

#	Searches	Results
1	((workplace violences) AND hospital AND (mental health OR psychiatr* OR behavioral health)) AND lo.Exact("US") Additional limits - Language: English	33