PAPER

PSYCHIATRY

Donna M. Lynch,[1] M.S.N. and Helen C. Noel,[2] Ph.D.

Integrating DSM-IV Factors to Predict Violence in High-Risk Psychiatric Patients

ABSTRACT: This study incorporated Axis-II and Axis-IV factors in DSM-IV to test the relationship between predicted risk for violence assessed in the psychiatric emergency room and actual violence during hospitalization. Psychiatric nurses lack an objective instrument to use during the acute psychiatric assessment. The retrospective study comprised consecutive psychiatric admissions ($n = 161$) in one tertiary veterans' hospital. Statistical testing for the predictive power of risk factors, relationships between variables, and violent events included nonparametric tests, factor analysis, and logistic regression. Of the 32 patients who committed violence during hospitalization, 12 had committed violence in the psychiatric emergency room. Statistical significance was shown for violent incidents and dementia, court-ordered admission, mood disorder, and for three or more risk factors. The 13-item Risk of Violence Assessment (ROVA) scale suggests validity and sensitivity for rating DSM-IV factors and psychosocial stressors to predict risk for violence during hospitalization. Replication studies are recommended to strengthen validity of the ROVA scale.

KEYWORDS: forensic science, diagnostic and statistical manual of mental disorders (DSM-IV), aggression, assault, assessment, instrument, psychiatric, risk factors, self-harm, suicidal, violence

Violent psychiatric patients injure nearly 25% of public psychiatric nurses each year (1,2). Ten percent of hospitalized psychiatric patients commit the majority of inpatient violence—a major cause of surging healthcare costs in the psychiatric setting (2–5). Neither clinical judgment nor risk assessment instruments currently in use have been shown to reduce violent events in the psychiatric setting (2,6,7).

The purpose of this study was to incorporate Axis-II and Axis-IV risk factors in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) in a multiaxial-based instrument to test the relationship between predicted risk for violence assessed during the acute psychiatric emergency room admission and actual violence during hospitalization in the locked psychiatric unit. Kettles et al. (8) found multiple validity and reliability issues in their review of 67 risk-factor instruments used to predict violence. Violence committed by hospitalized patients was more often related to multiple risk factors than to a single risk factor or a single psychiatric diagnosis (9,10). Despite decades of research, the clinical setting for psychiatric nurses lacks a single, objective, user-friendly, standardized, evidence-based instrument for predicting risk for violence (11). A literature review reveals a broad variety of approaches to examining precipitants of violence in the psychiatric setting.

The Overt Aggression Scale (OAS) includes psychiatric diagnosis plus five factors that focus on the setting during a patient assault. Chang and Lee (12) examined witnessed inpatient aggression among ($n = 111$) hospitalized psychiatric patients in Taiwan using the OAS translated into Chinese and an intensive process of data collection. Excluded from the study were patients with comorbid substance abuse or a diagnosis of personality disorder. Chang and Lee found no causal relationship between length of hospitalization and patient violence.

Chioqueta and Stiles (13) applied the Beck Depression Inventory (BDI) and two structured interviews in a Norwegian study of ($n = 142$) patients. The BDI is a 21-item self-report scale to assess severity of depression, the Structured Clinical Interview for DSM-III (SCID-II) to assess Axis-II disorders, and the Structured Clinical Interview for DSM-III-R (SCID-I) to assess Axis-I diagnoses. Criteria included consecutive, psychiatric, outpatient clinic admissions over a 5-year period. Excluded were patients with a history of substance abuse, alcohol abuse, or a lifetime history of psychosis. Results showed (i) in the absence of a comorbid lifetime depressive disorder, a significant relationship between dependent personality disorder and suicide attempts; and (ii) cluster A and cluster B personality disorders were significantly related to suicide attempts.

The Historical, Clinical, Risk management-20 (HCR-20) checklist contains three subscales of 10 historical items, five clinical items, and five risk variables. The HCR-20 assesses risk of future violence in adults with past violence and/or personality disorder or a major psychiatric diagnosis. Validity for a predicted level of violence is time-limited to a specific treatment phase. Data collection includes documented sources, interviews with others, and staff observations. The literature review includes three studies that used the HCR-20.

In the first study, De Vogel and De Ruiter (14) applied a Dutch version of the HCR-20 for ($n = 60$) adult patients in a forensic psychiatric hospital. De Vogel and De Ruiter compared coding by experienced forensic clinicians and coding by treatment supervisors. Results and interrater reliability were compromised by bias, lack of clarity, unclear definitions, subjectivity by coders, and global multiple interpretation.

In the second study, McKenzie and Curr (15) used the HCR-20 to determine whether violence committed during the initial 2 weeks

[1]VA Connecticut (VACT) Healthcare System, Department of Nursing/118, 950 Campbell Avenue, West Haven; and Southern Connecticut State University, New Haven, CT.

[2]Retired; VACT Healthcare System, 950 Campbell Avenue, West Haven; Courtesy Clinical Professor/Graduate Nurse Practitioner Program, Yale University, New Haven; and Sacred Heart University, Fairfield, CT.

of hospitalization was related to future violence. McKenzie and Curr studied ($n = 94$) patients with a primary diagnosis of a major mental illness who were hospitalized at least 4 months. The researchers reviewed historical records, admission assessment, and nursing observations. Seventy-five percent of inpatients committed violence at least once. Historical and clinical subscale items failed to distinguish between violent and nonviolent patients. Although a diagnosis of personality disorder predicted future violence, actual violence during hospitalization was insignificant.

In the third study, the HCR-20 checklist was used with the Psychopathy Checklist: Screening Version (PCL:SV) and the Violence Screening Checklist (VSC). The PCL:SV assesses violence in the community after hospital discharge. The five-item VSC assesses short-term inpatient violence albeit lacks historical risk factors. Twenty items on the PCL:SV measure characteristics of psychopathy; its use requires a complex set of stringent criteria (16,17). Nicholls et al. (17) used the HCR-20, PCL:SV, and VSC to differentiate between violence during hospitalization and violence post-discharge in the community among ($n = 268$) involuntarily hospitalized male and female psychiatric patients. Sixty-six percent of inpatients committed altercation. Inpatient assault correlated with violence within 100–500 days postdischarge. Incomplete data collection for the HCR-20 and PCL:SV precluded determining risk level for future violence. During the initial 14 days of hospitalization, high scores on the VSC distinguished between violent and nonviolent males. Neither the HCR-20 nor the PCL:SV was able to predict physical violence by female patients postdischarge (17).

The Brief Psychiatric Rating Scale (BPRS) measures symptoms related to psychopathology. A clinician rates 18 items on a seven-point Likert scale. The 53-item Brief Symptom Inventory (BSI) measures three global scores and nine primary mental symptoms. The 21-item Beck Depression Inventory (BDI-II) uses self-report to assess current depressive symptoms. The 12-item Multidimensional Scale of Perceived Social Support (MSPSS) uses self-report for perception of support system. The 30-item Barratt Impulsiveness Scale (BIS) uses self-report to measure impulsivity. Ferguson et al. (18) applied the BPRS, BSI, BDI-II, MSPSS, and BIS to examine impulsivity, social isolation, and depression as risks for violence for ($n = 212$) psychiatric inpatients in a locked unit. Findings were strongly positive for hostility albeit not for social support, depression, gender, or diagnosis. Patients' self-report data showed no relationship to actual violence committed on the unit. Physicians' assessment of patient hostility at admission correlated with actual violence. Depression showed no relationship to actual violence. Ferguson et al. (18, p. 135) strongly recommended "identifying at-risk patients early in the admission process, and tailor therapeutic interventions appropriately to minimize risk to patients and staff."

Flannery et al. (9) used the Assaulted Staff Action Program (ASAP) (19,20) report form to examine the relationship between subsequent assault and past violence, personal victimization, and substance abuse disorder in a study sample of ($n = 843$) male and ($n = 933$) female children and adults in psychiatric hospitals in Massachusetts. Clinical staff completed the ASAP report form at the time of each assaultive incident from clinical chart data and discussions with ward staff. Data were incomplete. Past assault and/or past substance abuse were related to subsequent assault. However, patients without past assault and without past substance abuse committed assault during the study (9).

The MacArthur Violence Risk Assessment Study performed between 1992 and 1995 used informed consent sampling to explore incidence of community violence for ($n = 951$) discharged psychiatric patients, between 18 and 40 years old, and with diagnoses of schizophrenia, bipolar disorder, depression, and alcohol abuse and/or abuse of drugs. Data for 134 risk factors were collated for 1 year postdischarge from documented violence history, patient self-reports, and interviews with collaterals. Results showed that discharged psychiatric patients were not more likely to commit violence than other residents in the community (21).

Torrey et al. (22) reanalyzed the 1995 MacArthur study and highlighted three major predictors of violence: past violence (23), personality disorder or adjustment disorder, and a co-clinical diagnosis of substance abuse. Torrey et al. theorized that psychiatric outpatient treatment for people with severe psychiatric disorders reduced community violence. A multiple iterative classification tree (ICT) emerged from the 1995 MacArthur Study (24,25). The ICT aims to validate categories of psychiatric patients at high risk for violence. The ICT filters 106 risk factors, generates five prediction models, describes five classification levels of risk for violence, and labels high-risk patients into alpha, beta, and delta groups based on job histories, recidivism, and baseline functioning. Treatment focuses on group-specific management strategies (26).

The Classification of Violence Risk (COVR) software program is directly related to the 1995 MacArthur study (24,27) and to the ICT (26). The interactive COVR integrates the ICT, requires a computer, and operates as an actuarial risk assessment tool to evaluate patients hospitalized with a psychiatric illness. The COVR uses data from inpatient interviews and a brief chart review to determine statistical risk for violence for several months after hospitalization. Use of the COVR showed (i) unreliability of self-report information; (ii) incomplete historical and current data collection; (iii) inaccuracy of clinical judgment of risk; (iv) subjective risk estimate to the multidisciplinary team; (v) implications for risk management; and (vi) false-positive or false-negative risk of violence classification (24).

The 1995 MacArthur Study researchers performed a validation study and applied the COVR instrument to a new study sample (25). Results of the validation study showed a decline in predictive power. McCusker's (28) review of COVR data showed limitations of the tool to predict risk of violence: (i) The COVR "is likely to be of only limited help in identifying risk factors to be addressed in a comprehensive risk management plan" (p. 683); (ii) the COVR operates as a purely actuarial tool; (iii) the COVR raises the probability of misclassifying patients at the highest risk for violence; (iv) the COVR focuses on the patient interview and self-report, each method weakens objectivity and reliability; and (v) the COVR end-point analysis may reveal a false very-high risk or false very-low risk of violence prior to patient discharge (28).

The review of current studies reveals complexities in study design and outcome data. Some studies excluded either Axis-I, Axis-II, or Axis-IV risk factors in DSM-IV, focused on subjective self-reports, used complex instruments, and were hampered by incomplete data collection (29,30). Dementia was shown to pose an independent high risk for violence. Patients with moderate to severe dementia commit explosive altercations, repetitive assault, and self-harm (31). For patients with dementia who are over age 85, frequency and severity of violent incidents worsen with advancing age and affect up to 50% of patients. Parkinson's disease, vascular dementia, and alcohol or illicit drug abuse heighten violence in patients with baseline dementia (31,32). A combined diagnosis of schizophrenia with manic phase of bipolar mood disorder heighten risk of violence (33,34). Schizophrenic patients with severe abnormalities in motor and integrative function and schizophrenic patients with impulse control disorder pose a high risk for repetitive violence (3).

We developed an evidence-based Risk of Violence Assessment (ROVA) scale to be performed by psychiatric nurses in the

psychiatric emergency room (PER). In a previous trial, we performed a pilot study to strengthen the ROVA scale, minimize subjectivity, and limit misinterpretation. We hypothesized that (i) scores would not differ between psychiatric nurses independently completing the ROVA scale and (ii) identified risk factors would correlate with subsequent violence.

In constructing the ROVA scale, we applied key elements integrated from research: (i) optimize objectivity during data collection; (ii) establish standardized, operational definitions for each predictor variable; (iii) clarify what to observe and what to measure; (iv) implement a standardized summative scale of predictor variables; (v) define categories of risk from low to high; and (vi) develop a data collection tool to document actual violence during hospitalization (19,29,35,36).

Operational Definitions

Altercation by the aggressor is an escalation of noisy, heated, angry, and threatening behavior aimed at another person or persons (37,38). Aggression is an intentional forceful goal-directed action—rage, anger, hostility, altercation, or assault; the result is physical or mental harm to a victim (39,40). Assault by the aggressor projects a threat or use of force on another person or property; the person senses imminent harm or offensive contact (41). Non-OPT refers to noncompliance with scheduled psychiatric outpatient clinic appointments for at least 10 weeks (22). Self-harm encompasses suicidal ideation, a suicidal plan, attempted suicide, and self-mutilation. Self-mutilation includes acts of violence against self and ranges from mild, to severe, to life-threatening. Self-mutilation and attempted suicide overlap (38,42). Substance abuse includes illicit drugs or substances; in our study, we distinguished between substance abuse (nonalcohol) and alcohol abuse. Suicide includes suicidal ideation, method to carry out a plan, past self-harm, suicide attempts, and self-mutilation (40,42). Violence includes aggression, altercation, assault, and self-harm (39). For this study, violence encompasses assault and self-harm (43).

Methods

Subjects and Procedures

This study was performed at one tertiary Veterans Administration Healthcare System (VAHS) hospital in the northeast U.S.A. For fiscal year 2005–2006, total enrollment at the VAHS facility comprised 64,064 veterans of which 12,620 (19.7%) veterans were enrolled in Mental Health Service (MHS), the latter with 241,681 MHS annual visits. Prior to the study, approval was granted in accordance with the ethical standards of the institutional Internal Review Board at the VAHS facility. Retrospective data were collated from (n = 161) patients' electronic clinical medical records for all consecutive admissions to the psychiatric unit through the PER over a 6-month timeframe.

All subjects had been discharged before intake and outcome data were collected. Three psychiatric nurses independently completed the ROVA scale using data routinely collected and electronically recorded at the initial PER assessment. One experienced geriatric nurse independently reviewed subjects' electronic medical records from inpatient days in the locked psychiatric unit and completed the Violence Event Form for violence committed during hospitalization. The geriatric nurse was blinded from ROVA scale data collected during the initial PER assessment. Violent incidents were categorized as assault and self-harm. The ROVA scale and the violence event form each takes <10 min to complete.

Instrument

The ROVA scale contains four parts: (i) Axis-I clinical disorders; (ii) Axis-II personality disorder; (iii) Axis-IV psychosocial, environmental problems, and associated severe psychosocial stressors; and (iv) risk assessment and intervention. The format integrates risk factors in DSM-IV (30) and risk factors listed in the National Patient Record Flags (PRFs) Policy (43). Patients with psychiatric disorders are assessed in the PER prior to admission to the locked psychiatric unit. The PRFs Policy is used throughout the VAHS to alert staff to patients at high risk for violence.

The psychiatric nurse in the PER performs the acute patient assessment and reports initial findings to the clinician and clinical team. The multidisciplinary clinical team includes the psychiatric resident or attending psychiatrist, psychiatric nurse who performs the initial assessment, social worker, and nurse practitioner.

The ROVA scale contains 13 risk factors integral to Axis-I, Axis-II, and Axis-IV of DSM-IV (Appendix A). The scale provides a structured, multiaxial, evaluation of psychiatric patients admitted to the PER. Simple summative scoring classifies degree of risk. Each factor is scored "1" (Yes) or "0" (No). The ROVA scale is designed to maximize predictive accuracy and minimize errors in scoring related to subjectivity or misinterpretation (44).

The Risk Assessment and Intervention section of the ROVA scale is used to summarize data from the 13-item ROVA scale. Total risk score on the ROVA scale, degree of risk, and particular risk factors are used to predict risk level for subsequent violence. The total risk score is used to assign risk level as low (one to two risk factors), medium (three risk factors), or high (four or more risk factors). Dementia, assaultive behavior, and self-harm each pose a high independent risk for violence (43). Possession of weapons poses an independent high risk for violence—at least 8% of patients bring weapons to the PER (23,33,43).

The Violence Event Form (Appendix B) is used to document violent incidents that occur during hospitalization in the locked unit. Data are collected on assault, self-harm, inpatient day of violent event, and time of day of violent event during hospitalization in the locked unit.

Axis-I clinical predictors include five factors: dementia, mood disorder, schizophrenia, alcohol abuse, and nonalcoholic substance abuse (33). The legal limit for blood alcohol level (BAL) is used to document alcohol abuse. A drug screen is used to document substance abuse. For the patient who refuses a BAL or a drug screen, the clinician's clinical judgment of patient safety determines holding time in the PER, release to the community, or hospitalization. Alcohol abuse disorder and substance abuse disorder together or independently pose a high risk for violence (22). Risk for violence among substance abusers shows greater complexity when additional risk factors are present such as a co-psychiatric diagnosis and/or coexisting multiple high-risk factors (9,22).

Axis-II encompasses personality disorder. Personality disorder increases risk for violence particularly among patients with a coexisting Axis-I clinical disorder. Axis-IV psychosocial and environmental problems heighten risk for violence in patients with a coexisting Axis-I and/or Axis-II disorder (3,13,15,22,33) especially for patients with a history of violence, court-ordered admission, and/or weapons concealment (2,22,23,29,32,33,45–48).

Axis-IV represents a multifaceted construct amalgamating psychosocial and environmental problems and associated severe psychosocial stressors. Seven items on the ROVA scale comprise multifaceted risk factors: legal issues at admission, non-OPT program, self-harm risk, assault risk, job status, home status, and support system. Psychiatric patients admitted to the PER with pending

legal issues, joblessness, homelessness, self-harm risk, and/or without a stable support system pose a significant risk for violence consistent with combined positive DSM-IV multiaxial risk factors (10,24,33). Past assault poses a 60% predictable, 63% sensitivity, and 85% specificity risk for future violence (36) in the context of concomitant severe psychosocial stressors, Axis-I, Axis-II, and/or Axis-IV factors (2,33). A significant finding in the MacArthur Study revealed that patients with severe psychiatric disorders who reside in the community and are compliant with scheduled OPT for 10 consecutive weeks show a decreased risk for subsequent violence (22).

Statistical Analysis

Data were analyzed with the SPSS statistical package, version 10. Differences between violent and nonviolent subjects were tested for statistical significance using nonparametric tests. Data were skewed. A normal distribution was deemed unlikely in this veteran population. Statistical tests included the Mann–Whitney U-test and Kruskal–Wallis test. Factor analysis was performed to rule out possible redundant risk factors. Logistic regression analysis with integral forward and backward stepwise testing was performed to test the predictive power of risk factors and to analyze relationships between each factor. No direct association was shown between altercation and actual assaultive violence during hospitalization.

Results

Male subjects totaled 153 (95%) and females 8 (5%). Age ranged from 24 to 90 years ($M = 51.7$, SD $= \pm12$). Length of stay ranged from one to 95 days ($M = 12$; SD $= 17.92$). Distinct from altercation events, 14 patients committed violence in the PER and 18 patients committed violence during hospitalization. Of the total ($n = 32$) patients who committed violence, 12 committed violence both in the PER and during hospitalization. Statistical significant differences were detected between violence during hospitalization and (i) dementia (<0.001), (ii) court-ordered admission (0.006), (iii) mood disorder (0.010), (iv) total score of three risk factors (0.005) on the ROVA scale, and (v) total score of four or more risk factors (<0.001) on the ROVA scale. No statistical significance was shown for two or less risk factors on the ROVA scale.

Table 1 shows violence split into three types: altercation, assault, and self-harm. Escalating altercation poses a heightened risk for subsequent violence (38). Data were collected for altercation. A total of 73 (45%) of total ($n = 161$) study subjects committed single or combined types of violence in the PER and/or during hospitalization. Patients who committed violence in the PER and during hospitalization showed the highest number of risk factors

($M = 8.14$). Number of risk factors for violence showed similarities in the PER ($M = 6.53$) and during hospitalization ($M = 6.81$). Electronic medical record data showed that all violent incidents were of minor severity throughout the study period and that preventive protocols were initiated during early signs of violent behavior in compliance with VAHS policies (43). During hospitalization, 18 patients committed physical violence with eight incidents on the second day, seven on the third day, and three during the second and third weeks of hospitalization. Our findings of a high incidence of violence during the initial 3 days of hospitalization contrast with Soliman and Reza's findings; the researchers found a high incidence of violence late in hospitalization rather than early (2). Other studies have shown that violent events are more likely to occur early during the first 8 days of hospitalization (36,45).

In Table 2, statistical significance was detected between violence and (i) schizophrenia with alcohol abuse (<0.001), with past assault (0.001), and with non-OPT (0.003); (ii) mood disorder with past assault (0.001), and with non-OPT (0.005); (iii) personality disorder with alcohol abuse (<0.001) and with substance abuse (<0.001); and (iv) schizophrenia and mood disorder with alcohol abuse (<0.001), with court-mandated admission (0.001), with past assault (0.001), and with past self-harm (0.002). Without coexisting risk factors, neither schizophrenia alone nor mood disorder alone showed a relationship to violence. Alcohol abuse, substance abuse, past assault, court-mandated admission, and non-OPT each operated as a strong risk factor for violence for patients with an Axis-I or an Axis-II diagnosis. Past assault operated as a consistent Axis-IV risk factor for subsequent violence, a finding supported in other studies (19,29,31,49,50). Female subjects ($n = 5$) were underrepresented in this study.

During hospitalization, peak hour of violence occurred at 13:00 ($n = 5$) following lunch. Two smaller hourly peaks occurred at 20:00 h ($n = 3$) when patients were gathered in the recreation area and at 23:00 h ($n = 3$) when patients were instructed by psychiatric nursing staff to retire to their rooms in accordance with established psychiatric unit protocols. Each peak of violence occurred during high patient density. Studies have shown that violent events are more likely to occur during enhanced patient stress and stimulation, high patient density, meal times, and recreation area gatherings (45).

Table 3 shows results of interrater reliability for the ROVA scale. Three nurse raters independently collated admission data on the ROVA scale. Three sets of data were completed for ($n = 140$) subjects. Data were incomplete for 21 subjects and were omitted from the analysis; missing data were related to diagnosis of

TABLE 1—*Violence in the psychiatric emergency room and during hospitalization.*

	$n = 73$		
	PER ($n = 56$)	Hospitalized ($n = 32$)	PER and Hospitalized ($n = 14^*$)
Altercation	54	27	14
Assault	10	15	11
Self-harm	04	03	01
Mean risk score	6.53	6.81	8.14

PER, psychiatric emergency room.
*Fourteen of the ($n = 73$) patients committed violence in the PER and during hospitalization.

TABLE 2—*Violence during hospitalization (n = 32): relationship to coexisting risk factors.*

	p-Value*					
Risk Factors	Alcohol Abuse	Substance Abuse	Legal Admit	Non-OPT	Past Self-harm	Past Assault
Diagnoses						
Schizophrenia	<0.001		0.015	0.003	0.012	0.006
Mood disorder				0.005		0.001
Personality disorder	<0.001	<0.001	0.034		0.022	0.019
Dementia						0.030
Schizophrenia with mood disorder	<0.001		0.001	0.008	0.002	0.001

Fixed factors: Inpatient violence, past self-harm, and past assault.
Covariants: Alcohol abuse, substance abuse, legal issues, non-OPT, and no support.
*Full factorial general linear model multivariate analysis; df = 1.

TABLE 3—*The ROVA scale: interrater reliability.*

Risk Factors	$n = 140$			
	M	SD	Z	p*
Schizophrenia	0.44	0.50	−0.722	0.470
Mood disorder	0.77	0.42	−0.989	0.323
Personality disorder	7.14E-02	0.26	−3.243	0.001
Dementia	9.29E-02	0.29	0.000	1.000
Alcohol abuse	0.45	0.50	−0.120	0.905
Substance abuse	0.32	0.47	0.000	1.000
Legal issues	0.40	0.49	−0.122	0.903
Unemployed	0.94	0.23	0.000	1.000
Homeless	0.35	0.48	−0.376	0.707
Non-OPT	0.73	0.44	−2.290	0.022
No support	0.56	0.50	−1.925	0.054
Past self-harm	0.69	0.46	−0.387	0.699
Past assault	0.56	0.50	−0.909	0.364
Risk score	6.41	2.10	0.541	0.588

Risk scores were collated independently by three raters.
*Nonparametric tests for K independent groups with Kruskal–Wallis test.

personality disorder and compliant or noncompliant OPT. Correlations were satisfactory between the three raters with the exception of scoring for personality disorder and for non-OPT. Statistical testing showed satisfactory internal consistency for the ROVA scale. Personality disorder showed inconsistent documentation as a diagnosis on patients' electronic medical records. Data entry for non-OPT required scrutinizing 10 weeks of data in the electronic clinical medical record to establish the most recent compliant OPT visit; one or more raters may have inadvertently missed some electronic entries.

Discussion

This study of violence in an acute inpatient psychiatric setting contrasts with previous research. Studies have regularly excluded Axis-II personality disorder and/or omitted Axis-IV psychosocial and environmental factors when exploring risks for violence. Major strengths of this study are directly related to DSM-IV risk factors for violence: (i) the inclusion of Axis-II personality disorder as a risk factor for violence and (ii) the inclusion of Axis-IV psychosocial and environmental factors and severe psychosocial stressors as risk factors for violence. Consistent with the research literature, dementia, without other risk factors, showed a direct relationship to unpredictable and repetitive violence (31,32). No evidence of causality was found between violence and schizophrenia in the absence of other risk factors (19,46,51) or between violence and personality disorder in the absence of other risk factors (2,31,52).

Limitations of this study include (i) an intentional retrospective nonrandomized record review; (ii) a short 6-month timeframe; and (iii) a narrow plan of care linked to the acute PER admission for the psychiatric nurse performing the initial patient assessment prior to the psychiatric clinician's assessment. A retrospective study design, rather than a prospective design, was selected to avoid an ethical dilemma of identifying patients at high risk for violence prior to a potential violent event. It is possible that other patient characteristics and other extrinsic variables may trigger violence during hospitalization in a locked psychiatric unit.

Alcohol abuse and/or other nonalcoholic substance abuse each exacerbated risk for violence among patients with a coexisting diagnosis of Axis-II personality disorder or an additional Axis-I clinical disorder. Results of this study suggest heightened risk for violence in three distinct conditions: (i) dementia plus past history

of assault, (ii) compulsory legal admission, and (iii) mood disorder. Results of this study appear to support the predictive value, sensitivity, and specificity of the ROVA scale as a multiaxial evaluation instrument to identify patients at high risk for violence. Actual violence during hospitalization correlated with total score classifications on the ROVA scale. Satisfactory results were shown for interrater reliability and internal consistency of the ROVA scale.

This study was performed in a single VAHS and differs from previous studies that have examined precipitants of violence in the general population. Findings in this study suggest five conclusions. First, the ROVA scale provides a DSM-IV multiaxial evaluation of Axis-I, Axis-II, and Axis-IV factors to classify risk level for violence. Second, the evidence-based ROVA scale may identify patients at high risk for violence early, in the PER, prior to hospitalization in the locked psychiatric unit. Early preventive treatment for high-risk patients may decrease predictable violence and may decrease unnecessary resource use during hospitalization (1,2,5,18,29,44,53). Third, the ROVA scale suggests validity and sensitivity for rating Axis-I, Axis-II, and Axis-IV factors and psychosocial stressors to predict risk for violence during hospitalization. Fourth, the initial 8 days of hospitalization in the locked unit show the highest incidence of violence consistent with prior research (36,45). Fifth, clinical utilization and accuracy of the ROVA scale requires staff education, integration of operational definitions, and objective data collection.

Our findings provide an initial scrutiny of the ROVA scale to identify risk factors for violence by integrating Axis-I, Axis-II, and Axis-IV multiaxial risk factors integral to DSM-IV. Conclusions in our large study are preliminary in nature. We recommend that researchers replicate this study with large sample sizes to strengthen generalizability of the ROVA scale to predict risk for violence in different acute-care psychiatric settings.

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Additional information—reprints not available from author:
Donna M. Lynch, M.S.N.
VA Connecticut (VACT) Healthcare System
Department of Nursing/118
950 Campbell Avenue
West Haven, CT 06516
E-mail: donna.lynch@va.gov

Appendix A

Risk of Violence Assessment (ROVA) Scale

Psychiatric Emergency Room Admission Date (mm/dd/yy): _ _/_ _/_ _
Patient, last name: _____ Patient ID # __ __ __ __
<u>Instructions</u>: Circle each Yes/No item (1) or (0)
Add all subtotals for total score

Axis I: Clinical Predictors

PSYCHIATRIC DIAGNOSIS
Dementia	(1) Yes	(0) No
Mood Disorder (with or without depressive symptoms)	(1) Yes	(0) No
Schizophrenia (with or without psychotic symptoms)	(1) Yes	(0) No

ALCOHOL (ETOH) ABUSE* at admission or last 30 days   (1) Yes   (0) No
   BAL** in PER (if performed) _____

   * ETOH abuse: >2 oz hard liquor or >2 beers or >2 glasses of wine in 24 hours or binges.
   ** BAL: Blood Alcohol Level

   Drug Abuse other than alcohol
POSITIVE DRUG Screen at admission or within last 30 days   (1) Yes   (0) No

   Subtotal: Axis-I Score_____

Axis II: Personality Disorder

PERSONALITY DISORDER   (1) Yes   (0) No

   Subtotal: Axis-II Score_____

Axis IV: Psychosocial and Environmental Problems and Contributory Stressors

LEGAL ISSUES at admission   (1) Yes   (0) No
   Pending court date or court-ordered admission
   PEC* Involuntary admission
   * PEC: Physician Emergency Certificate
   On probation or has a probation officer
   On parole or has a parole officer

NONCOMPLIANT OUTPATIENT TREATMENT for 10 CONSECUTIVE WEEKS

             (1) Yes   (0) No
   Scheduled Psychiatric Outpatient Treatment
   Scheduled Mental Hygiene Clinic
   Community Services (Case Management and/or other Health Agency)

SELF-HARM RISK   (1) Yes   (0) No
   Active suicidal attempt
   Active suicidal ideation
   Active suicidal plan
   Active self-harm
   Past self-harm
   Past suicide attempt

ASSAULT RISK to OTHER PERSON or PROPERTY   (1) Yes   (0) No
   Past assault
   Altercation: Heated argument/threat, quarrel, or confrontation
   Assault: Physical harm to other person or property – includes homicidal
   Wearing weapon/weapon in vehicle/owns weapon

JOBLESS, NON-VOLUNTEER, and/or
  NO OTHER WORK PROGRAM   (1) Yes   (0) No
  HOMELESS   (1) Yes   (0) No
  PRE-ADMISSION: UNRELIABLE SUPPORT SYSTEM*   (1) Yes   (0) No
*Intact/Reliable: Face-to-face or phone contact between patient and a family member, friend, or contact at least every 24 hours.

Subtotal: Axis-IV Score_____

ROVA Scale: Risk Assessment and Intervention

Axis-I score _____
Axis-II score _____
Axis-IV score _____
TOTAL SCORE: _____

Complete steps 1–5
1. Total risk score for violence (circle)
        Low = 1–2 risks
        Medium = 3 risks
        High = 4 or more risks
2. Additional high risk factors for violence include past history or current:
   Dementia   _____
   Assault, to person or property   _____
   Self-harm   _____
   Possession of weapon(s)   _____
3. Review findings with the admitting clinician and multidisciplinary team members.
4. Implement plan of care established by admitting clinician and multidisciplinary team.
5. Document findings and plan of care in the electronic progress note.

Appendix B

VIOLENCE EVENT FORM: PATIENT HOSPITALIZED IN LOCKED PSYCHIATRIC UNIT

Complete Violence Event Form at discharge from locked psychiatric unit
Patient, last name: _____   Patient ID# __ __ __ __
Admission date (mm/dd/yy): __ __/__ __/__ __
Discharge date (mm/dd/yy): __ __/__ __/__ __

Instructions: Circle each item either "Yes" or "No"

ASSAULT   (Yes) (No)
  At admission day to unit   (Yes) (No)
  At Day 1 – 8   (Yes) (No)
  After Day 8   (Yes) (No)
Hour of Event (24-hour clock): _____

SELF-HARM   (Yes) (No)
At admission day to unit   (Yes) (No)
  At day 1–8   (Yes) (No)
  After day 8   (Yes) (No)
Hour of Event (24-hour clock): _____