Inpatient Seclusion: Description and Causes

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A total of 114 (31%) of 370 acute admissions to an inpatient unit over a one-year interval had at least one episode of seclusion or restraint. Four variables were significant predictors of seclusion and restraint. They were young age, diagnosis of borderline personality disorder, and two scores (irritability and total assets) on the Nurses Observation Scale for Inpatient Evaluation (NOSIE). More than 81% of the predictions were correct (Kappa = .37, p < .001). The four predictive variables were used to predict seclusion and restraint in a new sample of 80 patients. More than 79% of the predictions were correct (Kappa = .40, p < .001).

The restriction of inpatients secondary to imminent harm or occurrence of harm to self or others or property is of great concern to clinicians. Clear delineation of variables that influence the occurrence of violent acts might allow the clinician to take appropriate steps to restrict a patient by use of seclusion and restraint. Conversely, the mistake of inappropriately secluding or restraining a patient might, in large part, be avoided along with minimizing potential liability actions.

On a temporary basis, staff may legally take action as a practical matter with written justification to restrict a patient who is at risk for harm to self or others by using locked-door seclusion or mechanical restraint (wrist-waist or four- to six-point). Because a great deal of staff time and attention is devoted to patients at risk for harm, acute admissions to an inpatient unit over a one-year period were studied to determine the patterns and indications for use of seclusion and restraint.

The potential causes or antecedent events that precede a violent act which might result in harm have been discussed.\textsuperscript{1-5} It seemed reasonable to build upon the work of others by quantifying antecedent events that might serve as predictors for the violent acts that lead to the use of seclusion and restraint on a psychiatric inpatient unit.

Methods

Setting The State’s only state psychiatric hospital receives patients for admission by referral from mental health centers, or directly. The criteria for admission are major mental illness and
threat of or occurrence of harm to self or others or property, or due to inability to care for oneself outside of the hospital environment. The hospital is a modern facility that was only two years old at the beginning of data collection.

In general, patients are admitted and randomly assigned to one of two admission units. Readmissions are sent to the unit that had previously housed the patients.

**Data Collection** The variables that were evaluated are listed in Table 1. Data were recorded routinely on age, sex, race, religion, marital status, dates of admission, transfer, discharge, seasonality, diagnoses, information on seclusion and restraint, and various ratings by staff members.

The Nurses’ Observational Scale for Inpatient Evaluation (NOSIE)\(^6\) was completed by nurses shortly after admission and, when possible, shortly before transfer or discharge. Extensive training and retraining on inter-rater reliability was carried out, resulting in an intraclass correlation coefficient of .849 to .976.

A Brief Psychiatric Rating Scale (BPRS)\(^7\) rating also was done by a psychiatrist generally at admission and transfer and discharge. Testing of inter-rater reliability yielded an intraclass correlation coefficient of .891 to .959.

The Structured Clinical Interview for DSM-III-R, Patient Edition (SCID-P)\(^8\) was used, when possible, to establish the clinical diagnosis. Extensive inter-rater reliability testing was carried out by training staff psychiatrists and a staff psychologist in the use of the SCID-P. Neurologic diagnoses were established by careful history and physical examination with appropriate diagnostic testing.

Information on seclusion, four- to six-point restraint, and wrist-waist restraint was obtained from detailed records of the Department of Nursing, and included a description of type of event, (seclusion, restraint, wrist-waist), circumstances of the event, hours in seclusion/restraint, or wrist-waist, and date. Patients in four- to six-point restraint also were in seclusion, and those in wrist-waist restraint were not in seclusion, but under constant observation by staff.

The data were analyzed by using two-tailed \(t\) tests and chi square tests (Yates corrected for two-by-two tables) to screen the data for significant relationships using the Bonferroni correlation for multiple comparisons. Pearsonian correlation coefficients, principal components, and multicollinearity analyses were then carried out, as well as analyses of variance (ANOVA), and probit regression analyses.\(^9\)

**Results**

There were 370 admissions of 259 patients to the unit for the one-year in-
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terval beginning November 1, 1991. A total of 114 (31%) had at least one episode of seclusion or restraint. About 59% of the admissions were male and more than 99% Caucasian. The mean age at admission was 35.9 years ± standard deviation (SD) of 11.8. The mean ± SD years of schooling was 11.8 ± 2.5. The mean length of stay (LOS) was 24.6 days and ranged from 1–542 days. The median LOS was nine days, and the census ranged from 13–25.

Description of Seclusion and Restraint

The length of time from admission until the first episode of seclusion or restraint for 114 admissions ranged from the day of admission to 295 days. The episode was on the day of admission in 36 cases, and the median was two days (seven cases). A total of 88 patients had their first episode in the first seven days.

As shown in Table 2, 47 patients had their first episode as seclusion, 52 as restraint, and 15 as wrist-waist.

As patients sometimes exhibited more than one behavior that led to seclusion or restraint, a hierarchy of indications was determined and is shown from left to right across Table 2. Thus, 19 patients harmed themselves (e.g., attempted to hit head on the radiator) and 24 harmed others (e.g., threw a chair at a staff member).

A total of 55 patients had one episode of seclusion or restraint, and the remainder had two or more episodes.

As shown in Table 3, a one-way ANOVA comparing number of hours per episode of seclusion, restraint, and wrist-waist was not significant. However, a t test showed that an episode of restraint did last significantly longer than an episode of wrist-waist, suggesting that those in restraint were more agitated than those in wrist-waist.

It was noteworthy that some patients were placed in seclusion for such reasons as to prevent them from obtaining access to a sharp object that could be used for self-harm. Others were placed in restraint to prevent direct self-harm, such as scratching the face. As each patient had a relatively unique issue, it was not possible to analyze the data so as to make predictions about seclusion or about restraint as separate problems. Therefore, the seclusion and restraint data were pooled for subsequent analyses and referenced as SRW.

Seasonality For the 52-week interval beginning on November 1, 1991, census, number of episodes, and hours in SRW were evaluated. Data were ana-

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Indications for Use of Seclusion, Restraint, or Wrist-Waist (N = 114) (First Episode)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Harm Self</td>
</tr>
<tr>
<td>Seclusion</td>
<td>3</td>
</tr>
<tr>
<td>Restraint</td>
<td>13</td>
</tr>
<tr>
<td>Wrist-waist</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
</tr>
</tbody>
</table>

One Way ANOVA Comparing Hours Per Episode of Seclusion (S), Restraint (R) and Wrist-Waist (W)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>52</td>
<td>3.6</td>
<td>2.9</td>
</tr>
<tr>
<td>S</td>
<td>47</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>W</td>
<td>15</td>
<td>1.9</td>
<td>1.2</td>
</tr>
</tbody>
</table>

\( F (df = 2.111) = 2.12 p = .125 \)
\( t \) test comparing R and W, \( t = 2.65 p = .027 \)

Variables Related to SRW

As shown in Table 1, a large number of variables were evaluated in relation to SRW. More than 81 percent of the patients completed the NOSIE; the remainder generally had a very brief admission or refused to complete the test. As 36 patients were in SRW at the time of admission, detailed analyses of variables related to the later occurrence of SRW were conducted on 264 patients with complete data sets who had trait (e.g., age and sex) and state (e.g., NOSIE) data available before the occurrence of the first episode of SRW.

**Age**  The mean ± SD age in years of 55 patients with SRW was 32.9 ± 9.7 compared with 37.2 ± 11.9 for 209 patients who had no SRW. The results were statistically significant \( t = 2.45, \ df = 262, p = .015 \).

**Sex** The rate of SRW for 153 males was 23 percent, and for 111 females, 18 percent. The results were not statistically significant (chi square = 0.65, \( df = 1 \), \( p = .420 \)).

Overall, there were two peak intervals for SRW. The first was a two-week period ending December 26, when 16 patients engaged in 62 different episodes of SRW. The second was a prolonged interval in mid-August followed by the time from September 4 to October 15 when there were 6 to 10 patients and 27 to 56 episodes of SRW per week.

As the number of patients in SRW per week increased above four, there was a trend for the number of episodes per SRW patient to go up. The correlation coefficient was statistically significant \( r = .282, p = .043 \).

**Time of Day**  The 114 patients were most often placed in SRW on the 3–11 shift \( (n = 65) \), followed by the 7–3 shift \( (n = 33) \) and the 11–7 shift \( (n = 16) \). The most likely hour for SRW was after 6:00 p.m. and after 10:00 p.m. (11 cases each).

Multiple Admissions

The 63 patients \( (174 \) admissions) with two or more admissions to the study actually exhibited 23 combinations of seclusion, restraint, and wrist-waist (SRW) when admissions were compared. The rate of SRW for 196 patients with only one admission to the study was 32 percent and for 63 patients with two or more admissions, 32 percent on the first admission.

For 20 patients with SRW on the first admission, the rate of SRW on the second admission was 30 percent. For 43 patients with no SRW on the first admission, the rate of SRW for the second admission was 14 percent. The results were not statistically significant by the chi square test, due to the small sample size \( (X = 2.28, \ df = 1), \ (p = .13) \).
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NOSIE Scores  As shown in Table 4, the factor scores for irritability (IRR) and total negative factor (TNF) were significantly higher (poorer), and the total assets score (TOT) was significantly lower (poorer), for those patients who later had one or more episodes of SRW. The Bonferroni correction was used.

Psychiatric Diagnosis  There were 49 different established primary diagnoses for the 264 patients. The rates of SRW were similar among broad diagnostic categories as shown in Table 5. Also, due to the particularly high rate (40%) for SRW among substance abusers and the low rate for those with dysthymia (4%), the rates for each of these diagnoses were compared, in turn, with all other diagnoses as a group; the differences did not reach significance, probably because of the small sample size.

Also, rates of SRW for 20 patients with paranoid schizophrenia (25%) and 29 with schizoaffective schizophrenia (21%) were similar to the overall rate for other diagnoses when rates were compared by chi square tests.

When Axis II diagnosis was considered separately, the rate of SRW for personality disorder (n = 85) was 20 percent, similar to the rate for all other diagnoses. However, when 21 patients with borderline personality disorder were considered as a sub-group, the rate was 43 percent compared with 19 percent for the remaining 243 patients. The results were statistically significant (chi square = 6.71, df = 1, p = .0096). Ten patients had both borderline personality disorder and substance abuse as diagnoses, and 60 percent of them had SRW.

Neurological Diagnosis  The rate of SRW was 9 percent among 11 patients with neurological disorder and 21 percent among the remaining 253 patients. The chi square (0.96, df = 1) was not significant (p = .327).

Eleven patients had a neurological diagnosis that could have contributed to a violent act. The diagnoses were cerebral atrophy in three cases, right hemisphere

<table>
<thead>
<tr>
<th>NOSIE*</th>
<th>SRW (n = 55)</th>
<th>No SRW (n = 209)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>COM</td>
<td>31.0</td>
<td>7.8</td>
<td>33.8</td>
<td>7.7</td>
</tr>
<tr>
<td>INT</td>
<td>14.9</td>
<td>8.2</td>
<td>18.1</td>
<td>9.6</td>
</tr>
<tr>
<td>NEA</td>
<td>24.0</td>
<td>6.9</td>
<td>25.9</td>
<td>6.5</td>
</tr>
<tr>
<td>TPF</td>
<td>70.0</td>
<td>17.9</td>
<td>77.8</td>
<td>19.1</td>
</tr>
<tr>
<td>IRR</td>
<td>16.1</td>
<td>11.2</td>
<td>7.8</td>
<td>8.9</td>
</tr>
<tr>
<td>PSY</td>
<td>4.3</td>
<td>6.5</td>
<td>2.9</td>
<td>5.2</td>
</tr>
<tr>
<td>RET</td>
<td>4.1</td>
<td>4.9</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>TNF</td>
<td>24.5</td>
<td>12.9</td>
<td>15.2</td>
<td>12.1</td>
</tr>
<tr>
<td>TOT</td>
<td>141.5</td>
<td>27.1</td>
<td>158.6</td>
<td>27.9</td>
</tr>
</tbody>
</table>

COM = social competence, INT = social interest, NEA = personal neatness, TPF = total positive factor, IRR = irritability, PSY = manifest psychosis, RET = retardation, TNF = total negative factor, TOT = total assets score.

aSignificant after the Bonferroni correction for multiple comparisons.
dysfunction in two cases, and one case each of history of recurrent seizures, microcephaly with retardation, organic personality disorder, left temporal arteriovenous malformation, fetal alcohol syndrome, and mass in the posterior sella turcica.

**BPRS Scores** The admission BPRS score was available for some of the patients. The mean ± SD total score for 29 patients who later had SRW was 46.0 ± 11.6, and 46.9 ± 1.1 for 131 patients who had no SRW. The results were not significant (t = 0.102, p = .919). Also, further t tests on the 24 items and 5 factors were not significant when those with SRW were compared to the others.

**Other Variables** As shown in Table 6, the rates of SRW were similar regardless of marital status or religious preference. Educational level also was similar when those with SRW were compared to the others. It was not possible to evaluate SRW and race, as more than 98 percent of the patients were Caucasian.

**Length of Stay in Days (LOS)** As noted in Table 6, patients who had one or more episodes of SRW had a significantly longer LOS than the others. It is likely that SRW was an indicator of severe overt illness, and that it simply took longer for such patients to improve enough to be discharged.

**Prediction of SRW** Young age, borderline personality disorder, high scores on irritability (IRR) on the NOSIE, total negative factor (TNF) on the NOSIE, and low scores on total assets (TOT) on the NOSIE were significantly associated with the later occurrence of SRW as shown by the previous analyses. As TNF was collinear with irritability (r = .810) and TOT (r = -.842), only IRR, TOT, diagnosis of borderline personality disorder, and age were used for the final parameter estimates in making predictions.

As shown in Table 7, young age and low total assets (TOT) scores (negative coefficients), high irritability (IRR) scores, and borderline diagnosis were associated with the later occurrence of SRW in a probit regression equation that was highly statistically significant. Age, irritability, and total asset scores were significant as discrete variables, and borderline personality disorder came close to statistical significance.

In Table 8 the probit regression equation was used to predict who would and who would not have an episode of SRW at some point after a NOSIE was completed and age was recorded. The predicted SRW was cross-tabulated with the observed SRW. For example, 23 of 41 patients who were predicted to have SRW actually had an episode of SRW for a sensitivity of 56 percent. The specificity was 86 percent, and the overall percentage of correct predictions was 81 percent (Kappa = .37, SD ± .08, p < .001).
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Table 6
SRW According to Marital Status, Religion, Education Level (Years), and Length of Stay (LOS) in Days

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Number</th>
<th>Percent in SRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>127</td>
<td>24</td>
</tr>
<tr>
<td>Divorced</td>
<td>78</td>
<td>19</td>
</tr>
<tr>
<td>Married</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td>31</td>
<td>13</td>
</tr>
</tbody>
</table>

Chi square (df = 3) = 2.44 $p = .486$ ns

Religion
- Roman Catholic: 46, 28
- Protestant: 27, 30
- Other or unknown: 191, 18

Chi square (df = 2) = 3.87 $p = .144$ ns

Education and LOS

<table>
<thead>
<tr>
<th>Variable</th>
<th>SRW (n = 55)</th>
<th>No SRW (n = 209)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>Education</td>
<td>12.3</td>
<td>2.2</td>
</tr>
<tr>
<td>LOS</td>
<td>58.7</td>
<td>81.2</td>
</tr>
</tbody>
</table>

* Statistically significant by Mann-Whitney U.

Table 7
Results of Probit Regression Analysis of Variables Used to Predict Seclusion and Restraint (N = 264)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritability</td>
<td>.03184</td>
<td>.01046</td>
<td>3.40726</td>
<td>.01608</td>
</tr>
<tr>
<td>Total assets</td>
<td>-.00814</td>
<td>.00390</td>
<td>-2.08535</td>
<td>.03706</td>
</tr>
<tr>
<td>Age (years)</td>
<td>-.02143</td>
<td>.00890</td>
<td>-2.40762</td>
<td>.01608</td>
</tr>
<tr>
<td>Borderline Dx</td>
<td>.55044</td>
<td>.31018</td>
<td>1.77461</td>
<td>.07597</td>
</tr>
</tbody>
</table>

Chi square for significance of equation (df = 4) = 40.11. $p < .00009$.

Prediction of SRW in a New Sample
A new, additional sample of 80 inpatients from the same unit was evaluated using the four predictive variables and the coefficients from Table 7. The specificity of correctly predicting absence of SRW was 78 percent of 69 patients. The sensitivity of correctly predicting who would later have an episode of SRW was 82 percent of 11 patients. The overall percentage of correct predictions was 79% (Kappa = .40, SD ± .13, $p < .001$).

Discussion
The combined rate of seclusion, restraint, and wrist-waist (SRW) was 31 percent for acutely ill inpatients on one unit. The rate was within the range noted in other studies.10-12

The evaluation of a large sample of patients according to a number of variables including scores on the NOSIE, age, and diagnosis was followed by documentation of episodes of SRW that occurred in a portion of the patients.
Young age, low score on total patient assets (TOT-NOSIE), high scores on irritability (IRR-NOSIE), and diagnosis of borderline personality disorder were significantly related to the later occurrence of SRW. There was a high percentage (81%) of correct predictions of SRW when these four variables were used in a probit regression equation. The Kappa coefficient of .37 was significant as a measure of chance corrected percent agreement.\(^{13}\)

It was important to determine if the four variables and their coefficients from the probit regression equation could predict SRW in a new sample of 80 patients. In fact, 79 percent of the predictions were correct (Kappa = .40). The results indicate that the methodology has some practical application in an inpatient setting. It is important to emphasize that the success of the predictions was in part related to the high base rate of SRW. If the rate of SRW had been low, the success in making predictions would have been much lower, as pointed out by Beck.\(^{14}\)

The methodology used for the current investigation is noteworthy in that it represents the results of a prospective epidemiological study. It also represents an attempt at quantification. The methods may be useful in other inpatient and outpatient follow up studies and may provide a way to compare results from various studies. Although quantitative data cannot replace clinical judgment, it can serve as a useful adjunct to clinical evaluation.

The results suggest that the NOSIE, age, and diagnosis might be tested in other inpatient settings to make predictions of who might engage in SRW. If the predictions prove to be reliable, then subsequent patients who are at risk might be able to get special attention to prevent SRW, or “nip it in the bud” by use of extra medication, staff talks, etc.

Although the irritability and total asset scores on the NOSIE were the most significant predictors in the current study, other components of the NOSIE might be useful for predicting SRW in a different setting.

Likewise, a larger sample of patients rated with the BPRS could yield items on that scale that might have predictive value. In a prior study, Swett and Hartz\(^{11}\) noted that the Buss-Durke Hostility Inventory (BDHI) was significantly predictive of violent acts in a prison hospital, suggesting that there is at least one other predictive scale that can be used to assess current mood (a state variable) before the occurrence of a violent act.

Young age also was associated with
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the occurrence of SRW. As young age has also been a significant factor in SRW in other studies, the result was not unexpected. Easy to record at the time of admission, age is a useful trait variable (which changes slowly) that can be used along with state variables such as the NOSIE or BDHI to predict violent acts or SRW.

The results differ from those of Tardiff and Sweillan, who found that a diagnosis of chronic paranoid schizophrenia was associated with greater use of seclusion and restraint. Since the current study evaluated acute patients and the Tardiff study, chronic patients, it is likely that the difference can be understood in terms of the different characteristics of the two populations.

Patients with a diagnosis of borderline personality disorder are well known for their impulsivity. It is not surprising that these patients had SRW shortly after admission to an acute inpatient unit.

Neurological diagnosis was not associated with SRW in the current study. However, Lewis et al. and others have reported that neurological problems have been associated with violence.

Although males had slightly higher rates of SRW than females in the current study, the results were not significant. Because males have been reported to be more violent, it is likely that the results reflect the characteristics of this particular patient population rather than a general trend. The sex of the patient should continue to be evaluated in future studies of the prediction of violence.

Seasonality was evaluated and did show a peak frequency of SRW episodes during the interval around the Christmas holidays. Such a peak is in keeping with clinical observation that the patients are often more upset over the holidays. A second prolonged interval of heavy rise of seclusion and restraint occurred from mid-August to mid-October. However, a small number of particularly difficult patients contributed to that peak, making it unlikely that the late summer and early autumn were truly seasonal peaks. In short, a seasonal trend might generally involve a larger number of patients rather than merely a large number of episodes of SRW by a few patients.

There is slightly more evidence for a “critical mass” effect; as the number of patients per week in SRW increased to four or more, the number of episodes per patient went up. This suggests that patients who were already agitated had a tendency to continue to be agitated when many patients around them also were upset. This type of phenomenon deserves further investigation in future studies.

The indications for use of SRW ranged through a wide spectrum from threat (or actual harm) to self or others, to property damage. SRW most often occurred on the evening shift, reflecting the fact that admissions tended to occur more often then, and that fewer activities were available in the evening.

There was a slightly higher rate of SRW upon readmission for those who had SRW on their first admission. Although the rates did not reach statistical significance with a small sample, the
issue deserves further evaluation with a larger sample size.

Other variables such as marital status, education, and religious preference were evaluated and were unrelated to SRW in the current study. Two variables, medication history and history of violence, were not fully evaluated. First, medication compliance before admission was difficult to document. Also, most patients had their first episode of SRW shortly after admission, before prescribed medication for inpatients had a chance to achieve its full effect. However, those who had higher doses early in the hospitalization had similar rates of SRW to those who had lower doses when charts were reviewed. Nevertheless, a future study can more precisely evaluate the effects of medication on SRW. Second, most of the patients had either committed violent acts or were imminently about to do so and were admitted because of their potential for violence. A future study might be able to quantify the prior history of violence and any criminal history that a patient might have had.

In general, certain trait (age and borderline diagnosis) and state (NOSIE scores) variables were found to predict seclusion and restraint (SRW) in an acute inpatient setting. Similar variables should be evaluated in other settings to determine whether they are generalized predictors of violent acts and SRW.

References