

Trends in Use of Seclusion and Restraint in Response to Injurious Assault in Psychiatric Units in U.S. Hospitals, 2007–2013

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Objective: This study assessed trends in use of seclusion and restraint in response to injurious assault, including trends in percentage of assaults involving seclusion or restraint; average duration of seclusion; average duration of restraint using devices and holds (physical restraint); and percentages of restraint episodes involving devices, medication, and holds.

Methods: Monthly administrative data from 2007 to 2013 for 438 adult psychiatric units in 317 U.S. hospitals were aggregated to compute annual measures. Time trends were assessed with nonparametric tests.

Results: There was little evidence suggesting a decline in the frequency with which seclusion and restraint are used, but there were decreasing trends in average duration of physical restraint and percentage of restraint episodes involving devices.

Conclusions: Efforts to curb seclusion and restraint have apparently been successful in reducing use of devices in restraint and shortening restraint duration. There may be room for improvement in reducing duration of seclusion.

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In 2003, the Substance Abuse and Mental Health Services Administration adopted a National Action Plan “to reduce and ultimately eliminate the use of seclusion and restraint in mental health settings” (1). That same year, several organizations, including the American Psychiatric Association and the American Psychiatric Nurses Association (APNA), published a resource guide for reducing the use of seclusion and restraint (2). Two years later, *Psychiatric Services* devoted a special section to seclusion and restraint, with various authors discussing the cost and frequency of use of these coercive measures and repeating the call for a reduction in their use (3). The APNA echoed this call in a 2007 position statement supporting “reduction and ultimate elimination of seclusion and restraint” (4).

Given the attention that seclusion and restraint have received in the past 15 years, including regulatory changes in 1999 and 2006 by the Centers for Medicare and Medicaid Services (formerly the Health Care Financing Administration) and in 2009 by the Joint Commission, there are surprisingly few sources of large-scale data available on the frequency with which seclusion and restraint are used, average duration of restraint and seclusion episodes, or trends in these measures. Moreover, little is known about trends in the frequency with which various types of restraint (devices, medication, and holds) are used. Although studies have been

published on use of seclusion and restraint in a single hospital or system (5–7), without large-scale longitudinal data it is impossible to determine whether efforts to curb the use of seclusion and restraint have resulted in appreciable changes in U.S. psychiatric care.

The purpose of this retrospective study was to examine 2007–2013 data from a nationwide sample of adult psychiatric units to assess trends in the use of seclusion and restraint in response to injurious assault—including trends in the percentage of assaults involving seclusion; percentage of assaults involving restraint; average time spent in seclusion; average time spent in physical restraint (devices or holds); and percentages of restraint episodes involving devices, holds, and medication.

METHODS

Administrative data for assaults by patients during 2007–2013 were extracted from the National Database of Nursing Quality Indicators (NDNQI). Over 2,000 hospitals voluntarily participate in the NDNQI, which collects data at the nursing-unit level, screens and cleans the data, and provides confidential performance reports to hospitals for quality-monitoring and quality-improvement purposes. The NDNQI was established in 1998 and began collecting data on

assaults in psychiatric settings in 2005. The University of Kansas Medical Center's institutional review board provides oversight for NDNQI data collection. More information on NDNQI assaults data is provided elsewhere (8).

The sample was limited to adult psychiatric units reporting assaults data to the NDNQI in at least three of the seven study years. Units serving nonadult populations, such as adolescents, and units with a behavioral health or specialty (dual diagnoses) designation were excluded from study.

The sample comprised 438 inpatient units in 317 U.S. hospitals located in 45 states and the District of Columbia. There were 16 (5%) psychiatric hospitals in the sample, housing 43 (10%) sample units. Two-thirds ($N=208$, 66%) of sample hospitals were teaching facilities, including 62 (20%) academic medical centers. Nonprofit hospitals accounted for 77% of the sample ($N=245$), and the remainder were federal (8%, $N=24$), nonfederal government (1%, $N=32$) or for-profit (5%, $N=16$) facilities. Smaller hospitals (<300 beds) were well represented ($N=122$, 38%).

Over half ($N=237$, 54%) of the units in the study began reporting assaults data to the NDNQI during or prior to 2007; 147 (34%) reported data during all seven study years. Units reported data for a total of 23,458 months during the study period (53.8 months per unit, on average).

Hospitals that participate in the NDNQI report assaults data monthly for their participating psychiatric units. These data include the monthly count of injurious assaults (physical or sexual) involving at least minor injury (defined as involving pain, bruise, or abrasion; or resulting in limb elevation, topical medication, cleaning a wound, or application of ice or dressing) and the unit's total inpatient days for the month (based on one or more census methods). In cases of injurious assault, hospitals can optionally report the age and gender of the assaultive patient. If a patient carries out more than one injurious assault in a calendar month, assaults subsequent to the first assault are reported as repeat assaults.

For each injurious assault, hospitals choose from a list of options to identify one or more (up to four) interventions employed by staff in response to the assault. These options include restraint (including use of medication to subdue or restrict mobility), seclusion (including open-door seclusion), one-on-one observation, calling security or outside help, instructing the patient to leave the immediate area, escorting the patient away from the immediate area, and calmly talking to the patient. Hospitals can also report providing no response to the assault, providing a response not included in the list, or having no documentation of response.

For responses to injurious assault that involve restraint, hospitals classify the type of restraint as involving one or more devices (for example, blanket wraps, net restraints, and four- or five-point restraints), holds, or medication. In cases involving devices or holds (physical restraint), the patient's time in restraints is reported in minutes (if fewer than 60), hours (if fewer than 24), or days. Times are rounded to the nearest integer. Similarly, when a response involves seclusion, hospitals report the minutes, hours, or days spent in seclusion.

Two or more assaults by the same patient in a short period may result in a single staff response. Because hospitals may report this response multiple times, once for each assaultive episode, repeat assaults were excluded from the study to avoid duplication in counting responses to assault.

Data for individual assaults were aggregated to the month level for each unit and then aggregated across units and months to compute the value of the variable of interest for each study year. For example, the annual percentage of responses to assault involving seclusion was computed by dividing the total number of responses involving seclusion during the year by the total number of assaults. Percentage of responses involving restraint was computed similarly. Percentages of restraint responses involving devices, medication, and holds were computed by summing the total responses involving a particular form of restraint for the year and dividing by the total responses involving restraint. Average time in seclusion and average time in restraint were computed by summing the total hours in seclusion or restraint for each year and dividing by the total number of responses involving seclusion or restraint.

To assess trends, each study variable was plotted against time (year), and Kendall's sample tau coefficient was computed as a measure of each variable's association with time. Like Pearson's correlation coefficient, Kendall's tau takes values in the interval $[-1, 1]$, with a value of 1 indicating a perfect positive association and a value of -1 indicating a perfect negative association (9). Two exact, nonparametric tests were carried out for each study variable at an alpha level of .05 to test the null hypothesis of random variation across time—meaning no association with time—against the two-sided alternative of an upward or downward trend. The first was the Mann test, which is based on Kendall's tau; the second was the test proposed by Bartels, which is based on differences between ranks of observations in successive years (9). These tests, and Kendall's tau, are sensitive to both linear and nonlinear trends and do not depend on the distributional assumptions that underlie parametric approaches. All analyses were carried out in SAS, version 9.4.

RESULTS

Hospitals reported 8,002 injurious assaults (excluding repeat assaults) during the 12.9 million patient days of the study (.62 assaults per 1,000 patient days). The assaultive patient's gender was reported for 7,889 (98.6%) assaults; males accounted for 4,524 (57.4%) and females for 3,365 (42.7%) assaults. The average age of assaultive patients was 38.9 ± 17.1 . Patient age was missing for 242 (3.0%) assaults.

Seclusion was used in response to 1,362 (17.0%) assaults, and restraint was used in response to 2,515 (31.4%) assaults. These figures included 359 (4.5%) assaults involving both seclusion and restraint. Devices were the most commonly

used form of restraint, accounting for 1,449 (57.6%) of responses involving restraint, followed by medication (N=930, 37.0%) and holds (N=651, 25.9%). Multiple methods of restraint were used in 558 (22.2%) responses involving restraint.

Data for time in seclusion or restraint were missing for 141 (1.4%) episodes of seclusion and 149 (7.8%) episodes of restraint. The distribution of hours in seclusion was severely skewed, and 74 (5.4%)

episodes of seclusion lasted one or more days, including 16 that lasted five or more days. These observations had a substantial impact on the annual mean number of hours of seclusion and were removed from that part of the analysis, making the trend chart less erratic. Similarly, episodes of restraint lasting one or more days (N=54, 2.8%) were removed before the trend in average hours of restraint was analyzed. These deletions did not change the outcomes of the significance tests for trends.

Data for use of seclusion and restraint by year are shown in Table 1, along with Kendall's tau and the p value from the Mann test for each variable. [Time trend plots for use of seclusion and restraint, average hours in seclusion and restraint, and use of various types of restraint are available in an online supplement to this report.] The two nonparametric tests led to the same conclusions for every study variable, so p values for Bartel's test are not shown.

There was little evidence suggesting a decline in the use of seclusion or restraint during the study period. In fact, restraint was used more frequently in 2013 than in 2007 (34.1% versus 29.8% of assaults, respectively), although the trend tests for restraint frequency and for seclusion frequency were not statistically significant.

Average duration of seclusion was lower in 2012–2013 than in 2007–2011, but the trend was not statistically significant. There was, however, a statistically significant trend in average hours in physical restraint, which declined consistently across the years of the study. There was also a statistically significant decreasing trend in the percentage of restraints involving devices. The trend tests for use of medication and use of holds were not statistically significant.

From 2008, the percentage of episodes of restraint involving medication tended to move in the opposite direction as the percentage of episodes of restraint involving devices, suggesting that the decrease in use of devices may have come at the cost of more frequent use of medication [see online supplement]. A one-sided post hoc test of negative association was statistically significant (Kendall's $\tau = -.62$, $p = .035$), but the usual caveats about post hoc tests (of hypotheses suggested by observed data) apply.

TABLE 1. Trends in use of seclusion and restraint in adult psychiatric units in U.S. hospitals, 2007–2013

Variable	2007	2008	2009	2010	2011	2012	2013	Kendall's τ^a	p^b
Seclusion (%) ^c	18.8	18.3	14.4	14.8	18.0	17.0	18.4	-.05	1.000
Restraint (%) ^c	29.8	27.2	33.1	30.0	32.9	30.6	34.1	.52	.136
Hours of seclusion (average)	3.6	3.7	3.8	3.3	3.5	2.8	2.9	-.52	.136
Hours of physical restraint (average)	3.7	3.3	3.2	3.0	2.6	2.5	2.0	-1.00	<.001
Type of restraint (%) ^d									
Device	72.2	71.0	57.1	56.0	55.7	51.5	53.7	-.90	.003
Medication	30.0	28.5	35.7	34.2	42.7	44.4	34.8	.52	.136
Hold	18.7	17.9	23.1	29.8	28.6	26.2	29.1	.52	.136

^a Kendall's tau was computed as a measure of each variable's association with time.

^b Mann test of time trend

^c Percentage of all injurious assaults

^d Percentage of all episodes of restraint

DISCUSSION

This is the first study of nationwide trends in use and duration of seclusion and restraint in adult psychiatric units. There was no evidence that seclusion and restraint are being used less often in response to injurious assaults; because rates of injurious assault per patient day on adult units have remained roughly constant in recent years, at least in NDNQI facilities (8), these results suggest that rates of seclusion and restraint per patient day are not declining. However, there were statistically significant decreasing trends in average hours spent in physical restraint and in the frequency with which devices are used for restraint. Average hours in seclusion have fallen in recent years, after reaching a high point in 2009, but the trend was not consistent or statistically significant.

There has been some pushback against eliminating the use of seclusion and restraint altogether, with practitioners and researchers expressing concerns about the effect on safety when nurses are hesitant to restrain (10). They note that reduced use of seclusion and restraint can be accompanied by an increase in aggressive episodes (11,12). It is possible that hospitals have decreased use of seclusion and restraint to the point that substantial further reductions are judged to be unrealistic. Efforts to reduce the frequency of using devices for restraint and to reduce the duration of physical restraint, however, have apparently continued, and 2012–2013 data suggest that a decreasing trend in the duration of seclusion may be developing, as well.

Further research is needed to examine the association between use of devices and use of medication for restraint. There was some evidence that a decrease in the use of one of these methods tended to be accompanied by an increase in the use of the other, but this potential association should be studied at the nursing unit level.

One limitation of this study was the nature of the sample, which was not random. One could argue that hospitals paying to participate in the NDNQI tend to be more invested in quality improvement than many of their non-NDNQI counterparts, in which case the results may be overly optimistic.

Inferences should be drawn with caution. It should also be emphasized that episodes of seclusion and restraint that are initiated in response to injurious assault are only a subset of all episodes of seclusion and restraint, and they are likely to be less amenable to reduction efforts compared with episodes of seclusion and restraint that are initiated in response to lesser infractions.

CONCLUSIONS

Hospitals have had some success since 2007 in reducing average time spent in restraint and percentage of restraints involving devices. There may be room for improvement, however, in reducing duration of seclusion. Further large-scale research is needed to corroborate these findings.

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