



# Decline in Physical Restraint Use Following Implementation of Institutional Guidelines

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**OBJECTIVE:** To investigate the strategies implemented at our institution to reduce medical restraint use.

**BACKGROUND:** Restraints have been utilized to prevent agitation, self-extubations, and falls, although they are often associated with negative repercussions for nurses and patients.

**METHODS:** The restraint data at our institution were compared with the National Database of Nursing Quality Indicators (NDNQI) benchmark. We also described the measures taken to improve restraint documentation.

**RESULTS:** The number of patients in medical restraints, medical restraint hours, medical restraints/patient-days, and deaths in restraints at our institution all significantly decreased ( $P < 0.00001$ ). There were 27 self-extubations of restrained patients compared with 11 self-extubations of nonrestrained patients. The percentage of inpatients with restraints in critical care and step-down areas declined and remained below the NDNQI benchmark.

**CONCLUSIONS:** This study reports the processes implemented to reduce restraint use through enhanced communication and increased documentation. Further exploration into factors that may attain a restraint-free environment is warranted.

Physical restraints refer to “any limitation on an individual's freedom of movement or normal access to the body or the use of physical or mechanical device or material on the patient's body.”<sup>1(p166)</sup> Although the goal of physical restraints is to restrict patient movement or access to invasive medical devices (endotracheal, nasogastric, and chest tubes, as well as ventriculostomy catheters and central venous access devices) and falling, several adverse events have been associated with their use, including agitation and delirium, posttraumatic stress disorder, loss of dignity and autonomy, and pressure ulcers, as well as orthopedic, vascular, and peripheral nerve injuries.<sup>1-12</sup> Physical restraints have also been associated with an increased hospital length of stay, greater risk of nosocomial infections, and death.<sup>4,5,13</sup> The prevalence rate of physical restraints is 50 per 1000 patient-days with approximately 27 000 patients restrained every day in hospitals in the United States.<sup>7</sup> The incidence rate of self-extubation is 0.3% to 14.3% with a prevalence rate of 2.0 to 25.6/1000 ventilator-days.<sup>2</sup> Despite the intended aim of physical restraints to prevent self-extubation, it has been reported that higher rates of self-extubation occurred while patients had physical restraints compared with not using them.<sup>2,4-6,14,15</sup> Studies have described that approximately 74% of patients are physically restrained at the time of device disruption.<sup>16,17</sup>

Although nurses are the primary caregivers who are responsible for determining whether physical restraints are applied to patients, nurses often lack knowledge about the proper use of restraints and alternative therapies to implement prior to restraints.<sup>3,11,18,19</sup> Furthermore, there is an absence of standard guidelines for physical restraint use. Restless behavior has been reported as the main factor of applying or removing a patient's physical restraints, with improvement in cognitive status as the leading reason for removing restraints.<sup>18</sup>

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In the current study, we present our findings of the number of patients with medical restraints compared with the National Database of Nursing Quality Indicators (NDNQI) benchmark, medical restraint hours, medical restraint hours/patient-days, patient deaths in restraints, self-extubation and restraints, and patient satisfaction scores. We also discuss the plethora of interventions implemented at our institution to curtail the use the restraints.

## Methods

Under an institutional review board–approved protocol, our prospective study (January 1, 2018 to December 31, 2019) investigated restraint use at our institution, with the majority of these patients treated in the ICU. There were 54 ICU beds at the facility caring for complex neurological, neurosurgical, medical, surgical, and cardiovascular specialties. Physical restraints were defined as those involving the limbs and/or vest and used for medical/nonviolent means.

Prior to the initiation of this study, our institution observed an exceedingly high number of restraints used, primarily in the ICU. In January 2018, our institution implemented numerous strategies to curtail the use of restraints throughout 2018 (Table 1). By recognizing that restraint use stemmed from both an educational deficit and a cultural misalignment, our efforts focused initially on clarifying the regulatory requirements. Mandatory education with case studies and examples was explored, with the negative impact to patient outcomes highlighted. A member of our quality team reviewed restraint documentation daily with our nursing leaders and staff, showing examples of good documentation and where gaps were present. Through this education, we quickly realized that the documentation requirements were too onerous to place restrained patients outside of the ICU. We also realized that to achieve our desired cultural shift to a restraint-free environment, we needed to provide intense resources and focus in the ICU. We made a practice change that required any restrained patient to be placed in the ICU. On the rare occasion that a patient was moved outside of the ICU in restraints, the ICU assistant nurse manager (ANM) was responsible for assessing the patient and the use of restraints, as well as trying to de-escalate the restraints. This practice change created a heightened sense of awareness. For example, over the course of this study, we identified 2 patients who were diagnosed with strokes, which could have been missed if restraints had been applied.

While education was critical, true practice change occurred through embedding strategies, which guided accountability and sustainability while shifting the culture. Creating and sustaining change required layers of

**Table 1.** Interventions Implemented to Decrease Medical Restraint Use

- Mandatory medical restraint education for all ICU nurses, NMs, ANMs
- Bedside mentoring of restraint alternatives and least restrictive measures
- Discussion around culture change involving intubation and the need for restraints
- Leadership involvement at all levels, including CNO and chief administrative officer
- Concurrent review of need for restraints, barriers to removal, and documentation completed every shift by NMs or ANMs
- ICU ANM notified of all potential restraint needs outside of the ICUs prior to application
- ICU ANM assists bedside nurses outside of ICU with restraint documentation and working to remove restraints
- Restraint usage for each unit reported daily at safety call with leadership team
- Standard work instructions were created to assist nurses with accurate documentation
- House supervisors include unit and bed number of all restrained patients on their shift and report to leadership
- Restrained patients identified, current unit, documentation review, and identified barriers to removal sent to CNO, ICU leadership, and quality leadership each shift
- Secondary reviews of documentation, data collecting, and data reporting completed by the quality department

Abbreviations: NM, nurse manager; ANM, Assistant Nurse Manager.

intervention and transparency. Restraints were added to our daily safety call, consisting of the restraint type, plan for removal, and any barriers to removal. The patient safety aspect of restraints was reinforced, along with the accountability of awareness and de-escalation intentions. The house supervisor report included a section with the restrained patients' room numbers, which allowed the nursing directors and chief nursing officer (CNO) to view a snapshot twice per day to observe whether our processes were enforced. The restraint report reminded the ANM of the importance of restraint use, which was validated during the afternoon staffing meeting prior to the house supervisor's completion of the summary report.

The NDNQI was developed in 1998 by the American Nurses Association (ANA) in response to the ANA's Safety and Quality Initiative to track 19 nursing-sensitive quality measures, such as staffing ratios, falls, pressure injuries, and restraint use.<sup>9,20</sup> Used by 2000 hospitals in the United States, the NDNQI allows hospitals to compare measures of their nursing quality against national, regional, and state norms for hospitals of the same type and unit.<sup>20</sup> The NDNQI is the leading quality improvement and nurse engagement tool that allows nurses to effectively monitor performance and create interventions for improvement.<sup>9,20</sup>

The NDNQI requires that nurses perform a visual assessment of each patient on the unit to assess for the use of physical restraints. The prevalence survey is conducted on a designated day within each quarter on all reporting units; thus, the measures are provided based on a 1-day prevalence study. The data at our institution were compared by bed size with a peer group of bed size 300 to 399 by the NDNQI.

## Statistical Analysis

The methodology utilized for the statistical analysis consisted of the Mann-Kendall test for trend in time-series data, with the Holm correction for multiple comparisons. The analysis was performed for each month over the 2-year period, reflecting a 24-month test for trend in time.  $P < 0.05$  indicated statistical significance. The analysis was performed using R statistical software (version 4.0.0).

## Results

### Number of Patients in Restraints, Medical Restraint Hours, and Medical Restraint Hours/Patient-Days

The number of patients in restraints, number of medical restraint hours, and medical restraints/patient-days at our institution all significantly decreased over the 2-year period (all  $P < 0.00001$ ) (Table 2, Figures 1A-C). The percentage of inpatients with restraints in all ICUs combined at our institution demonstrated a statistically significant downward trend (Figure 2A). For the 2 years of the study, the percentage of inpatients with restraints in the critical care and step-down areas declined and remained below the NDNQI mean (except for the 1st quarter of 2018 for the step-down areas) (Figures 2B, C). The hospital-unadjusted measure of the percent of patients with physical restraints at our institution was higher than the NDNQI mean for only

the 1st quarter of 2018, whereas it remained below the NDNQI mean for the subsequent 7 quarters of our study (Figure 2D).

### Patient Deaths in Restraints

The number of patients who died while using restraints significantly declined over the 2 years of this study ( $P < 0.00001$ ) (Table 2, Figure 1D). Additionally, the percentage of patient deaths in restraints out of all patient deaths at our institution declined over this same period (from 34.2% to 4.3%).

### Self-extubation and Restraints

In 2018 and 2019, there were 27 self-extubations of patients in restraints compared with 11 self-extubations of patients without restraints.

### Patient Satisfaction Scores

Our institution's patient satisfaction score rank for Press Ganey greatly increased in 2019 compared with 2018 for rating and recommending the hospital and nurse communication (Table 3).

## Discussion

The use of restraints in the ICU has been an ongoing concern for this organization. In 2003, the American College of Critical Care Medicine Task recommended 9 clinical practice guidelines regarding restraining therapies in the ICU.<sup>21</sup> The goal was to ensure the safest yet least restrictive environment for patients. Physical restraints were recommended for clinically appropriate situations and not for routine use.<sup>21</sup> Additionally, the ANA enacted a position statement in 2012 that strongly supported RN participation in reducing patient restraints and seclusion to maintain patient autonomy and dignity.<sup>22</sup> The Perceptions of Restraint Use Questionnaire was also developed to measure the perception of nursing staff regarding physical restraints.<sup>23</sup>

Nurses have historically assumed that the absence of restraints may result in disruption of a medical device that may lead to life-threatening consequences for the patient.<sup>8</sup> Nurses' attitudes and perceptions regarding restraint use have changed as nurses acknowledge that restraints negatively impact psychological well-being of patients, their family, and nursing staff.<sup>1,6,9,13</sup> Nurses have generally eliminated misperceptions of restraints and embrace alternatives to physical restraints while concurrently improving patient outcomes.<sup>6,24</sup> Educating nurses about restraint-related clinical guidelines, specifically the application and removal of restraints, is integral to reducing restraint use. Furthermore, standardizing restraint procedures, establishing sedation/analgesia protocols, identifying and managing high-risk patients, weaning patients from ventilators and securing and

**Table 2.** Medical Restraint Use at Our Institution Following Implementation of Institutional Guidelines (January 1, 2018 to December 31, 2019)

Metric	January 2018	December 2019	P (Trend)
Number of patients in medical restraints	99	37	<0.00001
Medical restraint hours	13 672	2166	<0.00001
Medical restraint hours/patient-days	1.584	0.281	<0.00001
Number of deaths of restrained patients	13	2	<0.00001

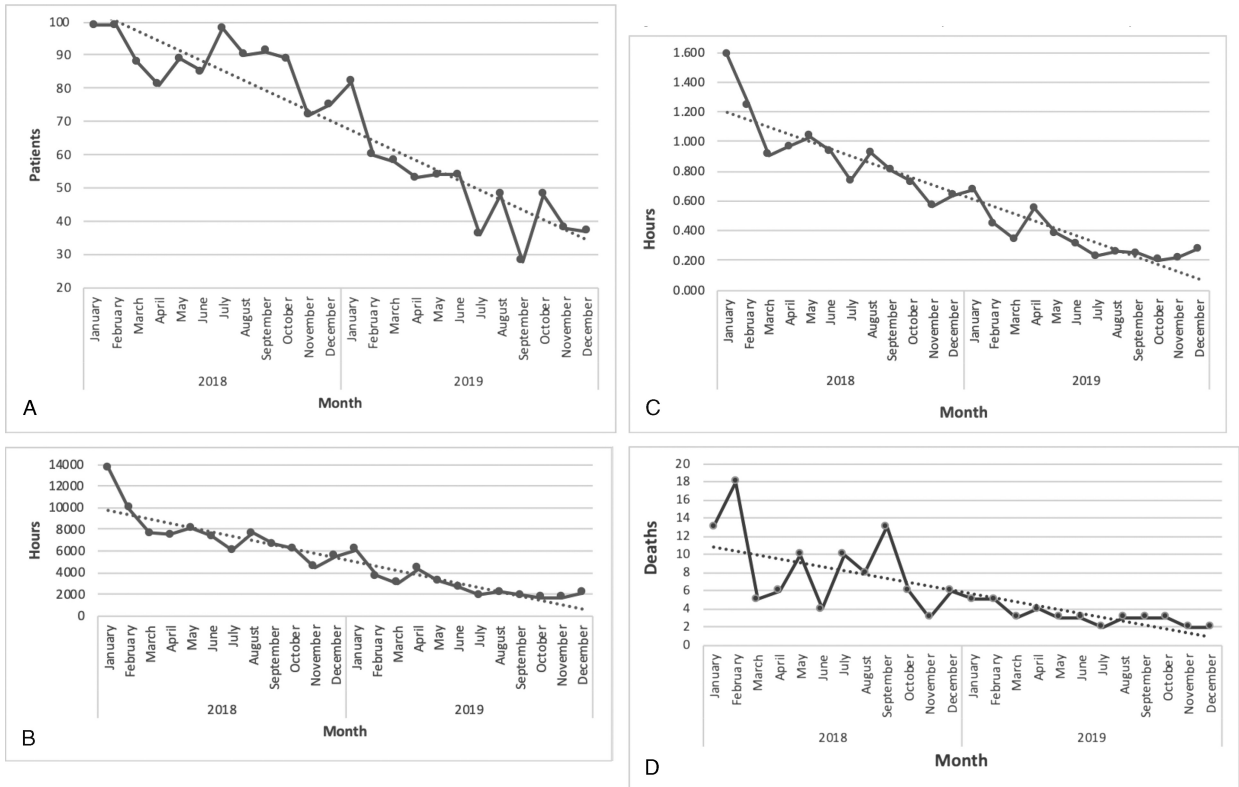


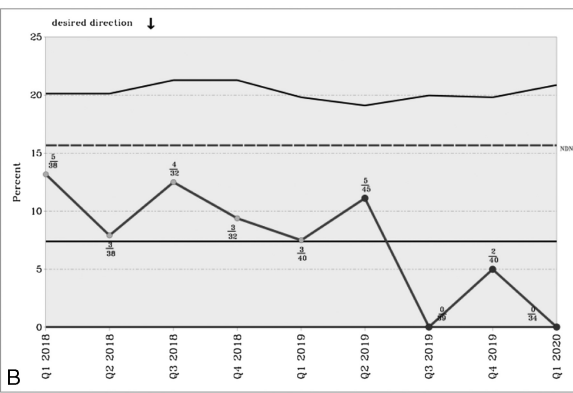
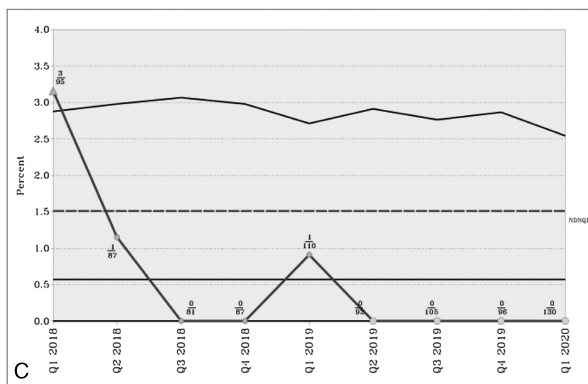
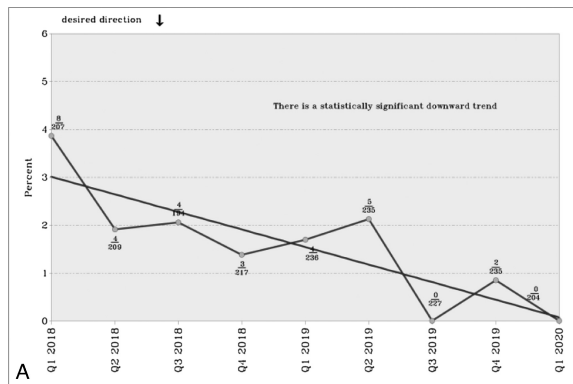
Figure 1. A, Number of patients in restraints at our institution (January 1, 2018 to December 31, 2019). B, Medical restraint hours at our institution (January 1, 2018 to December 31, 2019). C, Medical restraint hours/patient-days at our institution (January 1, 2018 to December 31, 2019). D, Mortality in restraints at our institution (January 1, 2018 to December 31, 2019).

stabilizing essential tubes all have proven beneficial in avoiding or curtailing the use of restraints.<sup>8,15</sup> Individualized decisions regarding restraint use in clinically appropriate circumstances should be the goal instead of routine use for all patients.<sup>21</sup>

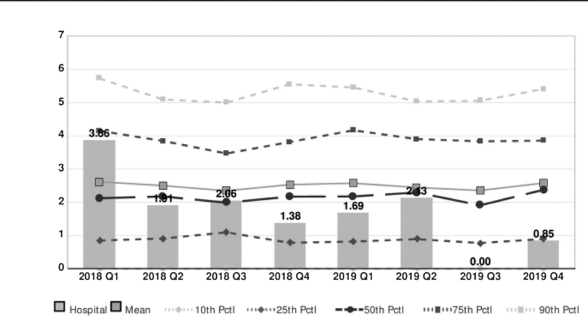
Similar to the present study, 2 studies in the literature compared their institutional restraint data to the NDNQI national benchmarks.<sup>4,9</sup> Kirk and colleagues<sup>4</sup> performed a risk-benefit analysis to determine whether to use restraints in their acute/critical care units. They reported a decrease in wrist restraint prevalence from 18.19% to 7.12% within the 1st year in the surgical ICU, less than the NDNQI benchmarks while preserving patient safety.<sup>4</sup> Additionally, there was a reduction in restraints in the acute/critical care units below the NDNQI mean without a corresponding increase in patient medical device removal. These authors reinforced the need to manage causes of agitation and protect patients from injury while simultaneously increasing patient satisfaction. Following Mitchell and colleagues'<sup>9</sup> implementation of a quality improvement process with a multiunit restraint collaborative, they decreased restraint rates to less than the NDNQI mean in their 5 ICUs. Furthermore, they were able to align nurses'

beliefs with evidence-based practice and encourage restraint alternatives.

Our 2-year prospective study of restraint use in a metropolitan community highlights the importance of educating nurses about restraints; enhanced communication between providers, patients, families, and leadership; and increased documentation of nursing flow sheets, care plans, and patient education nursing notes. A discussion involving the culture change associated with intubation coupled with restraint alternatives played an important role. Following the implementation of these strategies into daily practice, the number of patients in restraints, medical restraint hours, medical restraints/patient-days, and deaths in restraints at our institution all significantly decreased. Our study confirmed previous literature that the number of self-extubations of patients in restraints was substantially greater compared with self-extubations of patients without restraints. While our institution's patient satisfaction score rank for Press Ganey greatly increased over the 2 years of this study, it cannot be directly attributed to the decline in restraints, as other factors may have contributed to its rise. Our study serves as a model that may be applied to other hospitals.



Compared by: Bed Size  
Peer Group: Bed Size 300 - 399  
Measure: Percent of Patients with Physical Restraints (Limb and/or Vest)



Metrics	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Average
Hospital-Unadjusted Measure	3.86	1.91	2.06	1.38	1.69	2.13	0.00	0.85	1.74
Mean	2.62	2.50	2.34	2.53	2.57	2.44	2.35	2.58	2.49
Standard Deviation	2.15	1.94	1.86	2.15	2.07	1.92	1.89	2.10	2.01
10th Percentile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25th Percentile	0.85	0.91	1.09	0.78	0.82	0.89	0.77	0.90	0.87
50th Percentile (Median)	2.12	2.17	1.99	2.17	2.17	2.29	1.91	2.38	2.15
75th Percentile	4.15	3.85	3.47	3.81	4.17	3.90	3.83	3.86	3.88
90th Percentile	5.73	5.10	5.00	5.56	5.46	5.03	5.06	5.41	5.29
# Hospitals	132	131	135	136	137	137	132	136	134.50

Figure 2. A, Percentage of patients with restraints in all ICUs combined at our institution (January 1, 2018 to December 31, 2019). B, Percentage of patients with restraints in the critical care areas at our institution compared with NDNQI benchmark (January 1, 2018 to December 31, 2019). C, Percentage of patients with restraints in the step-down areas at our institution compared with NDNQI benchmark (January 1, 2018 to December 31, 2019). D, Percentage of patients with restraints at our institution compared with NDNQI benchmark (January 1, 2018 to December 31, 2019).

A limitation of the present study includes the escalation process for patients who were restrained outside the ICU. This process allowed critical thinking oversight prior to restraint application. Restraints were removed from all inpatient units except the ICU. Another limitation is that ICU ANMs were the only individuals who were able to obtain a restraint. These 2 interventions created a higher sense of awareness, which

accelerated organic growth. A 3rd limitation is that the study site was within 1 organization and may not be applicable in other settings.

### Conclusion

This study reports the daily processes implemented at our institution to reduce the use of medical/nonviolent

Table 3. Our Institution's Patient Experience Survey Rank for Press Ganey

Domains	2018	2019
Rate hospital 0-10 (0-10; 10 best, 0 worst)	39% rank	66% rank
Recommend the hospital (definitely "yes" to recommend the hospital to family/friends)	48% rank	63% rank
Nurse communication (courtesy and respect, listen carefully, explain to patient level)	23% rank	75% rank



restraints through enhanced communication, increased documentation, and continued education for nurses. As with any change process, we celebrated when we had several days of zero restraints or when our self-extubations with restraints exceeded our self-extubations without restraints. However, the greatest moment of satisfaction for our staff was a “thank-you” from a patient who was a nurse. She thanked our nurses for not restraining her. There can be no greater joy to a nurse than to be recognized by a peer for something that seemed so small at the beginning. This created a renewed energy around our goal of a restraint-free environment.

Future studies will analyze the lasting benefits of the myriad factors implemented at our institution to minimize restraint use. Further scrutiny may elucidate additional factors that may play a role in attaining a restraint-free environment.

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