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Impact of a Restraint Management Bundle on Restraint Use in an Intensive Care Unit

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Restraint use has been linked to longer lengths of stay and other undesirable outcomes. This evidence-based project explored the impact of a restraint management bundle on restraint use, quality, and safety outcomes. Results indicated that the proportion of intensive care unit patients restrained decreased significantly (24.3% vs 20.9%) following program implementation. Project results suggest that the restraint management bundle may provide a framework for guiding the process to reduce restraint use, minimize harm, and improve patient safety. **Key words:** *evidence-based practice*, *intensive care unit*, *patient safety*, *restraint management bundle*, *restraints*

RESTRAINTS, a nurse-sensitive indicator,[1] are routinely used by nurses in intensive care units (ICU),[2,3] creating patient quality and safety concerns.[4] Specifically, restraint use has been linked to longer lengths of stay (LOS), increased pressure injuries due to patient immobility, and increased inhospital mortality.[5,6] Often, nurses report using restraints to prevent patient harm due to a fall or self-extubation. Empirical evidence, however, does not support these notions.[2,7] Instead, patients with restraints often suffer more severe physical injuries from falls and device removal than nonrestrained patients.[8-10] More recently, Chang et al[10] reported that restraint use increased the risk for self-extubation 3-fold. Finally, restraint use has been found to negatively influence psychological well-being,[11] resulting in negative emotions for patients, families, and staff.[11,12]

Regulatory and accreditation agencies such as the Centers for Medicare & Medicaid Services, The Joint Commission, and Det Norske Veritas and Germanischer Lloyd (DNV GL) have adopted patient care standards to minimize restraint use.[13,14] These organizations support restraint use when patient harm is imminent and only after alternative interventions have failed.[13,14] The least restrictive intervention to effectively manage the patient's condition is recommended.[13,14]

The DNV GL restraint standards recommend that staff employ deescalation

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techniques and nonphysical intervention skills before selecting restraint or seclusion as treatment modalities.[14] Employees and contract staff providing patient care are required to complete restraint use and application education to be consistent with DNV GL standards.[14] Rainier examined alternatives to using restraints for alcohol-dependent patients.[15] The author noted that education and culture change had the only statistically significant effect in reducing restraint use.[15] Alternatives such as benzodiazepine administration had no significant effect in reducing restraint use.[15] Using best practices to educate frontline staff about restraint overuse is one effective way to positively influence nurses' decision making.[16] For example, one-to-one education provides opportunities to explore nurses' perceptions of alternatives to physical restraints.[2]

PROBLEM

In 2014, patient restraint data revealed that our hospital restraint use averaged 6.8% compared with 4.2% for our health care system. Subsequent review of ICU restraint data revealed that 24.3% of our patients were restrained. The ICU nurses anecdotally reported that restraints were most frequently used to mitigate patient falls and self-extubation. It was unknown whether a restraint management bundle (RMB) would decrease restraint use in our ICU.

Project aims

This evidence-based project explored restraint use along with quality and safety outcomes following RMB program implementation in the ICU. Differences in the proportion of restrained patients, restraint episodes per patient-day, ICU LOS, self-extubations, and patient falls were explored.

RESTRAINT MANAGEMENT BUNDLE

In August 2014, the ICU registered nurse (RN) unit coordinators and nurse leaders used the DNV GL standards to develop the RMB program (Table 1). This program was designed to educate ICU staff, reduce restraint use, and improve patient safety and quality. In addition, an interdisciplinary team created a patient-centric plan to minimize restraint use on the basis of patient attributes.

Table 1. Restraint Management Bundle Program Components

Restrained patients reported to hospital leadership daily, with a focus on restraint use >72 h
Twice-daily audits conducted to verify physician orders and nursing documentation
Safety partners positioned at the bedside (when available)
Audit results reported at shift change unit safety huddle
Staff educated on use of least restrictive devices

Daily assessment of patients

The ICU restraint incidences and length of time restrained were tracked every morning and evening by the RN unit coordinators. These data were disseminated each morning at the daily Hospital Safety Huddle, consisting of an interdisciplinary team that reviews safety concerns in the hospital. This information enabled hospital administrators and managers to remain engaged and knowledgeable regarding patient environment safety.

Customized restraint management education

While daily auditing and restraint awareness was useful, we identified the need to change the culture of automatic restraint use within the ICU. We used a 2-pronged approach to include real-time one-to-one and group education. During one-to-one education sessions, we reviewed the electronic medical record (EMR) and specific case scenarios for restraint options, specifications, and physician orders. Nurses completed restraint assessments to include a restraint risk-benefit

analysis, most appropriate and least restrictive restraint, physician order review, as well as daily assessment and restraint use documentation. During group education, nurses identified the appropriate restraint device on the basis of patient attributes and demonstrated the application of the various restraints from least to most restrictive. Education emphasized using the least restrictive device warranted for each patient scenario.

Standardizing and monitoring restraints usage audit tool

The hospital Accreditation Coordinator created the Standardizing and Monitoring Restraints Usage audit tool (see Supplemental Digital Content Audit Tool, available at: http://links.lww.com/JNCQ/A346) to review both restraint orders and documentation. The RN unit coordinators rounded on each patient with restraints and reviewed the EMR during each shift. These data were used to construct a patient restraint profile to evaluate the need for continued restraint use. The audit tool focused on the following: (1) documented evidence of alternatives tried before restraining the patient; (2) orders for every restraint episode with specific behaviors to justify restraint use; (3) documented level of consciousness or sedation was consistent with restraint indication; (4) visual check, circulation, range of motion, fluids, food, and elimination were documented every 2 hours; and (5) restraint type ordered and restraint type in use were documented and congruent.

METHODS

Design and setting

This project used a secondary data analysis and was conducted at a 224-bed community-based facility, a part of a 12-hospital health care system. The 24-bed general ICU admits patients to the critical care intensivist and hospitalist services, as well as to private cardiovascular and surgical practices. The ICU employs 65 clinical RNs and 12 nursing care partners. Clinical and utilization data were extracted for 2701 patients who were admitted to the ICU between October 2013 and June 2015. The project was approved by the local institutional review board.

Data collection

Data for the precohort group were extracted between October 2013 and June 2014, with data for the postcohort group extracted between October 2014 and June 2015. Because this was a secondary data analysis, the results did not imply cause and effect relationships. Data from the EMR were used to identify patients who were restrained during the project period. We created a restraints variable by coding those with restraints as 1 and everyone else as 0. In addition, we recorded number of restraint episodes per patient and the number of days a patient was restrained. Data for patient falls were extracted from a risk management software tool used by our health care system. We created a falls variable and coded those who fell as 1 and everyone else as 0.

At the time of a self-extubation, the ICU RN unit coordinators completed a debrief huddle and documented the circumstances surrounding the event. The critical care nurse specialist and the respiratory clinical specialist reviewed the documentation for each self-extubation event. Aspects of patient care that may have increased the risk of self-extubation were reviewed. Data for self-extubations were manually abstracted from this audit report. Self-extubation occurrences were coded as 1; if no self-extubation occurred, then the code was 0.

Statistical analyses

Descriptive statistics were used to describe the sample. Categorical variables were summarized by count and percent. Interval and ratio variables were summarized with means and standard deviations. Chi-square tests of independence and Mann-Whitney U tests were used to explore differences in variables. The associated χ^2 and Z statistics were reported. All statistical analyses were conducted using SPSS version 24.[17] Statistical testing was 2-sided with a significance α level set a priori

Table 2. Restraints Outcomes

	Pre n (%)	Post n (%)
Restraints		
Yes	326 (24.3)	284 (20.9)
No	1013 (75.7)	1078 (79.1)
Self-extubations		
Yes	11 (0.8)	13 (1.0)
No	1328 (99.2)	1349 (99.0)
Falls		
Yes	3 (0.2)	4 (0.3)
No	1336 (99.8)	1358 (99.7)

to .05. Project results were reported in aggregate only.

RESULTS

In the precohort group, there was a total of 1339 (52.7% male) patients with an average age of 63.9 (SD = 15.3) years compared with the postcohort group in which there was a total of 1362 (52.5% male) patients with an average age of 63.7 (SD = 15.7) years. We were interested in examining differences in the proportion of patients restrained, restraint episodes per patient-day, ICU LOS, self-extubations, and patient falls. As shown in Table 2, the proportion of patients restrained in the precohort group was 24.3% compared with 20.9% in the postcohort group ($\chi^2 = 4.717$, $P = .030$). The number of restrained patients per patient-day averaged 0.075 (SD = 0.187) for the precohort group compared with 0.059 (SD = 0.161) for the postcohort group ($Z = -2.330$, $P = .020$). The number of restraint episodes per patient-day averaged 0.191 (SD = 0.447) for the precohort group compared with 0.133 (SD = .315) for the postcohort group ($Z = -2.605$, $P = .009$).

The average ICU LOS was 3.64 days (SD = 4.40) in the precohort group compared with 3.60 days (SD = 4.03) in the postcohort group ($Z = -0.484$, $P = .628$). We observed 0.8% self-extubations in the precohort group compared with 1.0% in the postcohort group. The self-extubation rate was not calculated because the total number of intubations during the project was not reported. There were 3 falls in the precohort group and 4 falls in the postcohort group. Because of the low number of falls, we did not statistically compare the fall rates. In summary, there was a significant reduction in restraint use and duration, although ICU LOS remained stable over time.

DISCUSSION

Our findings are concordant with DNV GL restraint standards[14] and the work of Hurlock-Chorostecki and Kielb[16] in that education of frontline staff regarding restraint overuse positively influenced their decision making. The RMB as a patient safety strategy may provide opportunities to balance risks and benefits of restraint use for this vulnerable population. Minimizing the use of restraints may improve the patient experience. As a result of this project, we restrained 42 fewer patients without significantly increasing falls or self-extubations. In concordance with previous literature, preventing 42 patients from being restrained potentially minimized the risk of physical[9,10] and psychological harm,[11,12] safeguarded patient rights,[18] and minimized ethical distress for health care professionals.[19]

The RMB program represents our nurses' commitment to improve the patient experience. We recommend that alternative patient management strategies be explored before deciding to restrain. If restraints are applied, they should be the least restrictive and discontinued as soon as possible to avoid complications. In our ICU, safety partners prove to be beneficial and an effective alternative to restraint use. Many patients simply need gentle reminders not to get out of bed unassisted or disturb lifesaving tubes, intravenous lines, and/or other medical devices.

Clinical implications

The RMB project demonstrated that altering nurses' perceptions, attitudes, and beliefs may improve patient quality and safety by minimizing physical and psychological harm.

Although it took time, the philosophy of "seeing is believing" helped staff become more receptive and open to culture change. The RN unit coordinators reviewed staff decision making related to restraint application and type of devices pertinent to patient attributes. We began to slowly observe culture change with continued emphasis at skills fairs and shift huddles. Consistent with Hevener et al,[2] we found that one-to-one teaching was a particularly effective technique and a unique strength of our program. Prior to RMB implementation, we observed nurses immediately applying the most restrictive device (ie, soft wrist restraints) before trying other less restrictive measures such as freedom splints and mittens, or having family at the bedside. Following RMB education, nurses began to use a less restrictive device or did not restrain.

In addition to the aforementioned changes in patient care, the environment, and culture, we continued to review those patients restrained greater than 72 hours in our morning and evening shift huddles; hospital administrators and managers were kept apprised of these patients. By doing so, staff became more aware and no longer requested physicians to renew restraint orders but attempted to discontinue them and improve the safety of all our patients.

Limitations

Limitations may include lack of data integrity due to inaccurate, untimely, or missing EMR documentation. The sample population may not represent all restrained patients due to the low frequency of restraint use. A larger, more diverse sample may better reflect patient and clinical attributes associated with restraint use.

CONCLUSION

Patient restraints were widely used in our ICU, posing unique challenges to patient quality, safety, and psychological well-being. Real-time staff education positively impacted nurse decision making. Project results indicate that the RMB reduced restraint use, minimized patient harm, and improved patient safety.

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