Objectives: Describe and evaluate a method for assessing whether physical restraint prevalence differs by timing and frequency of data collection and to determine the minimum period of observation necessary to provide accurate prevalence estimates on both Intensive Care Unit (ICU) and medical–surgical units. Design: Two-period, cross-sectional design with repeated observations in year 1 for 18 consecutive days and in year 2 for 21 consecutive days with method modifications. Setting: 400-bed urban teaching hospital. Participants: All beds on general medical, surgical, and intensive care units. Measurement: Direct observation of patients, nurse interview, and medical record review conducted by trained observers. Results: There were no significant differences in mean restraint use prevalence rates comparing: (a) morning and evening periods; (b) weekdays and weekend days; and (c) observation periods of 7, 14, or 21 consecutive days or for 7 days using every 3rd day on either medical–surgical units or ICUs. Analyses using data from an increasing number of days of observation indicates that the mean prevalence rate stabilizes after 16 days. There were larger mean differences for comparisons on ICU–ventilator units and lack of significant differences may be due to low statistical power. Conclusion: Direct observation by trained observers, supplemented by nurse report and medical record documentation over brief monitoring periods, results in accurate, nonintrusive, cost-efficient estimates of physical restraint prevalence. As few as seven consecutive or nonconsecutive days in measuring restraint prevalence is sufficient to obtain accurate estimates, although the number of days may vary depending on patient mix and unit type.

Keywords: physical restraint; acute care; prevalence measurement

Efficient and Accurate Measurement of Physical Restraint Use in Acute Care

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There has been heightened interest in reducing physical restraint use in acute care by regulatory and accrediting organizations, including the Centers for Medicare & Medicaid Services (CMS) and the Joint Commission on Accreditation of Health Care Organizations (JCAHO), and health care professionals and researchers. This concern was addressed in long-term care well before the awareness in hospitalized patients, as evidenced by the implementation of the Nursing Home Reform Act of 1987, resulting in a reduction of physical restraint use in these settings (Castle, 1998). In order to track and ultimately reduce restraint use in acute care, there must be accurate and efficient methods for measuring restraint prevalence. The study design and measures used in long-term care may not be optimal in acute care settings. The purpose of this article is to describe a method for a hospital-wide study of physical restraint use that implemented more rigorous methods of estimating prevalence than found in previous studies. We also present data on differences in prevalence use by time of day, day of the week, number of days of observation, and consecutive as compared with nonconsecutive days to determine what the minimum period(s) of observation are that provide accurate data for tracking restraint prevalence on both Intensive Care Units (ICU) and medical–surgical units.

The benefit or effectiveness of physical restraints is not supported by the literature (Frank, Hodgetts, & Puxty, 1996; Marks, 1992). Rather, the dangers of restraints are well documented, including longer length of stay, confusion, discomfort, pressure ulcers, nosocomial infections, and even death by strangulation and asphyxiation (Evans, Wood, & Lambert, 2003; Jensen et al., 1998; Lofgren, Macpherson, Granieri, Myllenbeck, & Sprafka, 1989; Miles & Irvine, 1992; Molasiotis, 1995; Strumpf & Evans, 1988; Sullivan-Marx & Strumpf, 1996). The Food and Drug Administration (FDA) has estimated that at least 100 deaths per year are caused by physical restraints (2003). The estimates of injuries caused by physical restraints are most likely low, due to underreporting and ambiguity about whether the injury was caused by the restraint. In addition to physical harm, physical restraints have a detrimental psychological impact on patients, including anger, and resistance (Strumpf & Evans, 1988). The well-documented harms caused by restraints, with few, if any, benefits (Miles & Meyers, 1994), led to the restriction of physical restraints by the FDA in 1992 (Department of Health and Human Services, 1999).

Reported restraint prevalence rates in the United States and Canada range from 6% to 25% in acute care settings, with even higher prevalence for some types of units, such as ICUs (Bourbonniere, Strumpf, Evans, & Maislin, 2003; Frengley & Mion, 1986; Minnick, Mion, Johnson, Catrambone, & Leipzig, 2007;

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Minnick, Mion, Leipzig, Lamb, & Palmer, 1998; Mion, Fogel, & Sandhu, et al., 2001; Morrison, Crinklaw-Wiancko, King, Thibeault, & Wells, 1987; Robbins, Boyko, Lane, Cooper, & Janighen, 1987; Strumpf, & Evans, 1988). This variability may be due partially to inconsistent methods used to measure restraint use. Our systematic review of methods used to measure physical restraint use in acute inpatient settings included journals indexed in Medline, from 1986 to 2007. As shown in Table 1, a wide variety of methodologies for measuring restraint prevalence, including direct observation, nurse interview, chart review, and charges for restraints have been used. Retrospective chart review of physician orders and nursing notes was most often used to measure prevalence. Physician orders as a proxy for restraints, however, may overestimate prevalence when a restraint is not actually used, or underestimate prevalence when a restraint is used without an order or documentation. Underestimation of restraint use is supported by one study that used data from an "observational audit" conducted by a member of the restraint reduction team (Morrison et al., 2000) combined with charge data for restraints to provide a more complete estimate of prevalence. This audit found that only one third of restrained patients had orders and only 27% had nursing documentation. More stringent requirements from regulatory agencies might result in improved documentation, yet without a standard method to estimate prevalence; the result will reflect neither true frequency nor duration of use. Direct observation methods have been used, including prevalence for a single day during a 2 hour midday period, observation of patients twice on a single night, or measuring the proportion of patients physically restrained during the prior week based on observations by staff most familiar with the patient (Bourbonniere et al., 2003; Karlsson, Bucht, Eriksson, & Sandman, 1996; Minnick et al., 2007; O'Keefe, Jack, & Lye, 1996; Whitehead, Finucane, Henschke, Nicklason, & Nair, 1997). These methods may be subject to bias when unit staff members are the observers and time periods may not be sufficient to reflect the changes in patients, especially in acute care. Some reports did not state how prevalence was measured (Jensen et al. 1998; Wells, Brown, & McClymont, 1994) or lacked sufficient detail to allow replication. A comparison of direct observation, nurse interview, and medical–nursing records in nursing home and long-term care units revealed that both of the latter two methods were valid and reliable, but nurse interview yielded higher sensitivity and specificity than record review (Laurin, Voyer, Verreault, & Durand, 2004). No such comparsions are found in the literature for acute care.

METHODS

Setting

The study was conducted in a 400 bed urban academic teaching hospital in the northeastern United States. Four intensive care units, one chronic ventilator unit, and 17 medical or surgical units were included in the study. The study was reviewed and approved by the institution's Integrated Scientific and Ethical Review Board.

Design

A cross-sectional design with repeated observations was used. In 1997 selected units were observed for 18 consecutive days beginning on a randomly chosen Monday. Data were collected from all study units twice each day, between 5:00 a.m. to 7:00 a.m., and between 6:00 p.m. to 8:00 p.m. These times reflected differences in unit staff and visitor activity that may affect prevalence of restraint use. The evening period is also perceived to be a time of greater confusion for patients. Each observer completed two forms for each observation period. The Summary Observation included the date and time period, and one line for each unit with the census and number of patients restrained on that unit. For each patient restrained, we used the Restraint Observation form to document: patient ID number, date, unit, gender, age, type of restraint, and the reason for restraint. The study was repeated in 1998 with three modifications. Because we found no difference in restraint use frequency between morning and evening periods, observations were made only during the morning period. The units were observed for 21 consecutive days to determine whether a more stable estimate was achieved.

Sampling

All beds on general medical and surgical units, including a geriatric acute care unit, medical intensive care unit, surgical intensive care unit, neurosurgical intensive care, and cardiac and cardio thoracic surgery intensive care units participated in this study. Pediatrics, psychiatry, and rehabilitation medicine inpatient units and the emergency department were excluded.

Measures

Prevalence of physical restraint use was calculated daily for each unit by dividing the number of restrained patients on the unit by the census of patients on the unit for the time period measured. We used the CMS definition of physical restraints, which is "any manual method or physical or mechanical device, material or equipment attached or adjacent to a patient's body that he or she can not easily remove, that restricts freedom of movement or normal access to one's body" (Department of Health and Human Services, 2005). This definition includes chest and vest restraints, lap belts, wrist and leg restraints, mitts, and lap trays if they are used to restrict movement.

The census and number of patients in restraints were recorded for each unit at each time period. Triangulation of measurement (i.e., use of multiple measures) was used to obtain a more accurate estimate of prevalence. The trained study observer recorded the number of patients in restraints during the prior 12 hours by direct observation of the patient, direct questioning of the patient's nurse,

TABLE 1. Methodology of Prevalence Studies of Physical Restraint Use

Citation	Design	Sample	Measure	Strengths & Limitations
[26] Morrison, Crinklaw-Wiancko Thibeault, & Wells (1987)	• Each acute unit observed twice, 1 month apart • Extended care unit observed once	University facility in Canada with 620 acute beds, 400 extended care beds, 170 domiciliary beds *n* not reported	• Nurse and chart • Impartial nurse observer • Other data sources included patient care plan, bedside nursing note and head nurse	Strengths • Impartial nurse data collector • Multiple sources Limitations • No direct observations • Only two observations 1 month apart • Time of day or day of week not specified
[27] Frengley & Mion (1986)	Longitudinal Observation for 15 weeks, weekdays only, from 7 a.m.–5 p.m. once daily	Four 28 bed units in 750 bed teaching hospital. Every admission on those units for a period of 15 weeks *n* = 1,292	Observation of restraints by observer (not medical or nursing staff)	Strengths • 15 weeks of observation • Outside observer • Medical and nursing staff unaware of observations • Incorporated last 7 and first 8 weeks of residency training cycle Limitations • Excluded weekends and vacation • Once between 7 a.m. and 5 p.m. • Time period observed on each unit may have varied • If patient not present on unit, assumed not to be restrained
[9] Jensen, Hess-Zak, & Johnston et al. (1998)	• Longitudinal, continuous QI approach • Observational, intervention-restraint reduction program, management protocols and revised procedures; education	445 bed teaching hospital all patient care areas *n* not given *n* not reported	Observation of all "patient care areas" once monthly by different shifts on random days by restraint reduction task force members (nurses from different areas)	Strengths • Independent task force member observed • Randomly selected dates Limitations • Only monthly • Shifts not consistent across units
[14] Morrison, Fox, & Burger, et al. (2000)	Pre-, postintervention was consisted of interdisciplinary restraint reduction rounds twice a week, 6 week period	730 bed hospital 31 bed neuro–neurosurg 5 days observation *n* not reported	Physician orders (orders/month adjusted for volume) Via health information systems and charges for restraints without an order 2 weeks of observational audit	Strengths • Used multiple sources • Included 2 weeks of daily observation Limitations • Based on MD orders may have missed those with no orders • Observation audit does not indicate time periods, 1 week of data eliminated as invalid

[18] Whitehead, Finucane, Henschke, Nicklason, & Nair (1997)	Cross-sectional	Four teaching hospitals in Australia, medical units *n* = 408	Pair of MD and RN auditors visited each hospital between 10 a.m.–12 p.m. on a Sunday in November or December Restraints (including bedrails) identified by observation and chart review	Strengths • Included two methods, direct observation by a pair of auditors and chart review Limitations • Only observed on 1 day, one time period
[17] O'Keeffe, Jack, & Lye (1996)	Cross-sectional	850 bed teaching hospital in Great Britain, with 16 acute medical units (including 3 geriatric) 13 acute surgical units *n* = 668	• Independent observations of bedrails, restraining chairs, or other restraints on a single night by one of two geriatricians • Observations at least once, and for most twice, between midnight and 6:30 a.m.	Strengths • Patients individually observed by independent observer Limitations • Once or twice on a single night only • Daytime hours not included
[16] Karlsson, Bucht, Eriksson, & Sandman (1996)	Cross-sectional	"Somatic clinic" with 120 beds (assessment, treatment, and rehab hospital for diseases such as strokes and fractures) *n* = 116	• Retrospective reports by staff of restraint use in previous week	Strengths • Duration of 1 week Limitations • Data collected in a survey to the staff caring for the patients • Required recall of restraints in the prior week • Time of day and day of week not specified
[20] Wells, Brown, & McClymont (1994)	• Quasi-experimental study with observation pre- and postimplementation of new restraint policies, procedures, and education	Chronic care and rehab hospital in Canada Census of all patients in hospital preimplementation *n* = 170 8 weeks postimplementation = 101 (i.e., all patients restrained at preimplementation) 2 years postimplementation (new cohort) *n* = 165	• "Survey" of the use of restraints, positioning devices, safety devices and supports for every patient in the hospital • Seat belts if buckle was in front were excluded	Limitations • Unclear survey methods including time frame and data collectors

(*Continued*)

TABLE 1. Methodology of Prevalence Studies of Physical Restraint Use (*Continued*)

Citation	Design	Sample	Measure	Strengths & Limitations
[15] Bourbonniere, Strumpf, Evans, & Maislin (2003)	Observational, to explore relationship between RN staffing and physical restraint use	All nursing home patients admitted to acute care hospital *n* = 174	Direct observation by research assistant or study advance practice nurse daily. Restraint status confirmed by primary nurse and medical record	Strengths • Multiple sources • Daily data *Limitations* Limitations • Unclear time frame • Observer was also nurse involved in the intervention
[28] Powell, Mitchell-Pedersen, Fingerote, & Edmund (1989)	• Time trend study, with two cross-sectional prevalence studies (one in 1980–1981 and a second in 1986–1987) • Change in policy and practice and education for staff in late 1981	160 beds on a geriatric rehab unit in a 850 bed general medical hospital in Canada *n* not reported	• Restraint orders based on records from central supply • Incident report of falls from nursing records • Excluded bedrails	Limitations • Restraint use determined by central supply ordering • Assumption that issuing resulting in use • All episodes of use reflected in a new order
[29] Swauger, & Tomlin (2000)	Intervention consisting of education, staff development, and restraint consultation-charter was to reduce restraint use by 50%	Tertiary urban hospital with 500 or more inpatients/day every patient in restraints seen *n* not reported	Assessment tool completed on all patients before restraining. Team included RN, NA, PT, unit secretary, and behavioral health resource counselor	Strengths • Continuous monitoring Limitations • Assessment tool completed by unit staff
[30] Coble, & Davis (2001)	Pre-and postintervention Intervention consisted of a task force with policy revision, diversionary boxes, and staff education	877 bed tertiary care hospital medical–surgical, SNF, CV, and Rehab Units *n* not reported	Number of purchased soft limb holders and vest restraints during 8 months before intervention; and 8 months after intervention	Strengths • Gives overall picture of hospital use Limitations • Measure is based on purchases and may not reflect actual use • No time of day data
[31] Hancock, Buster, Oliver, Fox, Morrison, & Burger (2001)	Preexperimental design with education and interdisciplinary rounds focused on restraint reduction Monitoring by team facilitator for 6 months	All patients admitted to a transitional care unit *n* not reported	Number MD orders/100 patient days, "monitored" monthly Measurement method is not described	Limitations • Measure is based on restraints orders with no observation of restraints used

[19] Minnick, Mion, Johnson, Catrambone, & Leipzig (2007)	Longitudinal design, conducted for 15 weekdays from 5–7 a.m. and 3 randomly selected weekend days 1–2 units in each hospital also included 4–6 p.m.	Probability sample of 40 urban hospitals Excluded obstetrics, rehab, psych, and ER *n* = 434 units with 155,412 patient days Number of patients not reported	Direct observation and nurse report Reported number restrained patients/total patient days × 1,000 Measured reason for use	Strengths • Extended time period • Included weekends • Consistent times across units • Multiple institutions • Interrater reliability done Limitations • No chart review Unclear if data collectors also had direct patient care responsibility for the patients
[32] de Vries, Ligthart, & Nikolaus (2004)	Prospective cross-sectional descriptive study	17 geriatric acute care wards and 6 nursing homes in 9 European countries, 23 institutions 5,894 patient days	Questionnaire filled out on every restrained patient on 2 weekdays and 1 Sunday in a fixed 2-week study period	Strengths • Included weekends • Multiple countries • Multiple institutions Limitations • Limited time period • Unclear who filled out questionnaire • Restrictive legislation in some countries
[33] Demir (2007)	Cross-sectional descriptive study	Four University hospitals in Turkey ICU, neurosurg and ER 254 nurse interviews	Nurse interview of use in prior week	Strengths • First Evaluation done in Turkish hospitals Limitations • Relies on nurse recall • One time interview • Limited types of units

Note. Systematic review methodology: Literature search of Medline from 1986 to 2007 using the search terms of physical restraints alone and combined with prevalence, acute care, or hospital. References in papers accessed through this search were used to identify additional sources. Inclusion criteria were: inpatient setting, acute or rehabilitation hospitalization, physical restraint use, and reporting of prevalence rate. Exclusion criteria were: long-term care facility, psychiatric or pediatric inpatient unit, emergency department, and chemical restraints.

and reviewing the medical record for a restraint sticker. A restraint was considered to have been used during the past 12 hours if any of the following occurred: (a) the observer saw the restraint in use or on the patient's bed (e.g., a wrist restraint tied to the side rail), (b) there was a restraint sticker on the chart for that date, or (c) the patient's nurse stated that a restraint had been used during the past 12 hours. If there was incongruence among these three sources of data, any evidence of a restraint being used was recorded. If the patient was away from the room during the observation period, the observer relied on evidence of a restraint on the bed and information from the patient's nurse.

Data Collection Procedures

Upon arrival to the inpatient unit, trained observers asked the charge nurse the unit census and the names and room numbers of patients in restraints. All patients, including isolation patients, were directly observed for the presence of restraints, regardless of whether the charge nurse reported that they had been restrained during the last 12 hours. Observers checked under bedcovers for restraints if necessary. If there was an ongoing emergency in a room the observer skipped that room and returned later. The study coordinator performed quality checks on the study observers by completing observations on randomly selected shifts for randomly selected units. The number of observers was sufficient to complete observations for all patients on the participating units during the 2 hour time period for each shift. A greater number of observers were trained than were needed for each shift to allow for coverage as needed. We found that gaining the support of and cooperation from hospital administrators, nursing leaders, and staff prior to data collection was crucial for the success of this study.

Observer Training

The ability to understand and complete the study tasks and reliability were the fundamental qualifications for study observers. Most of the observers had no prior experience working in hospitals, and all were either nonmedical center employees or staff who worked in off-site satellite units of the medical center. We provided one full day for observer training that included: didactic lectures on the different types of restraints, demonstrations of each type of restraint in use; explanations of how to code the reason for restraint use, and three methods of determining whether a restraint had been used in the past 12 hours (direct observation, nurse report, and a sticker in the medical record); thorough review of study procedures, professional behavior and dress code, and a tour of the hospital, including introductions to nursing staff on the units. Observers were given a manual (available on request) with study procedures and pictures of the different types of restraints.

Data Analysis Plan

The pattern of prevalence rates among the 22 units was examined. A dichotomous measure for type of unit was then created with all medical and surgical units in one group and all ICU units in the other group. The chronic ventilator patient unit had restraint rates similar to rates on ICUs and therefore was grouped with the ICUs. We compared mean prevalence rates for: (a) morning and evening shift, (b) observation periods of different lengths, (c) observation periods of sequential and nonsequential days, and (d) weekdays as compared with weekend days. Comparison of morning and evening observation periods was possible only in 1997 because this was the only year that both shifts were measured. Data from both 1997 and 1998 were used for all other analyses, however direct comparisons between individual units are not appropriate due to restructuring of units during that time period. Mean prevalence rates based on an increasing cumulative number of days from one to all days was calculated using both the 1997 and 1998 data. Analyses were performed using SPSS, version 14.0 (2005).

RESULTS

In 1997, 226 individual patients were physically restrained at some point during the study period. However, the percent of patients restrained could not be calculated because the unit of observation that year was hospital bed and not the individual patient. There were 12,955 patient observations made in 1997, 1743 on the five ICU–ventilator units and 11,212 on the 20 medical–surgical units.

In 1998, 152 patients were physically restrained, 13% of all patients observed. There were 6,985 observations of patients, 1,033 on the five ICU/ventilator units and 5,952 on the 17 medical–surgical units included in the study.

Despite these large numbers of observations, one observer could comfortably complete four to six units in each 2-hour shift, a total of 50 to 90 patients, depending on the type of unit. Intensive care units and units with a high rate of ventilator use were more time-consuming due to the higher prevalence of restraint use.

To determine whether fewer observations would be as accurate, we compared: (a) morning and evening observation periods for 1997, (b) weekdays and weekend days for 1998, and (c) observation periods of 7, 14, or 21 consecutive days or for 7 days using every 3rd day on either medical–surgical units or ICUs for 1998 (Table 2). None of the differences between means were statistically significant. Prevalence rates for increasing number of days of observation for 1998 are shown in Figure 1. The mean prevalence rate appeared to stabilize after 16 days. All of the analyses conducted on the 1998 data were replicated using the 1997 data, with the same results. More detailed prevalence data by specific type of unit are presented in prior papers (Minnick et al., 1998; Mion et al., 2001).

DISCUSSION

This study provides evidence that as few as seven consecutive or nonconsecutive days in measuring restraint prevalence is sufficient to obtain an accurate estimate. Multiple observations over 18 random days in a 30-day period resulted in a stable prevalence rate for restraint use. On medical–surgical units, there was little variability

TABLE 2. Prevalence Rates for Different Times of Day and Days for the Week for Medical–Surgical Units and for ICUs

	Medical Surgical Unit		ICU and Ventilator Units	
Type of Comparison[a]	Mean	*SD*	Mean	*SD*
Time of Day (1997 data)				
Morning only	4.7	4.7	30.8	15.2
Evening only	4.7	4.2	34.4	16.0
Combined morning and evening	4.7	4.4	32.6	15.4
Day of Week (1998 data)				
Weekdays	4.7	5.8	22.9	15.1
Weekend	4.3	5.1	24.8	14.1
Number of Days (1998 data)				
7 consecutive days	4.4	6.4	21.7	7.9
14 consecutive days	4.4	5.4	26.7	11.2
All 21 days	4.4	5.4	27.8	11.2
Every 3rd day (total of 7 days)	4.4	5.5	28.6	12.5

Note. SD = standard deviation.
[a]All values were >.05.

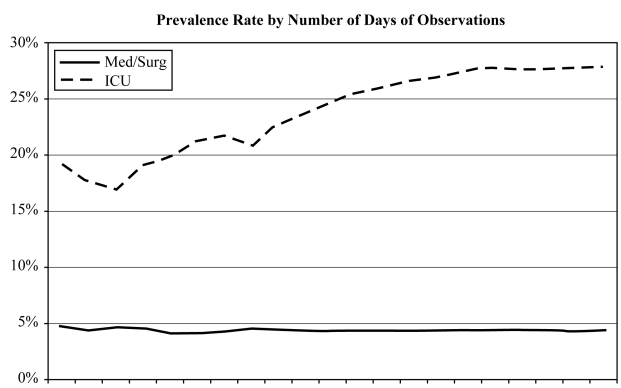

Figure 1. Prevalence rate for successive cumulative days from 1 to 21 for medical–surgical units and ICU–ventilator units, 1998.

in restraint prevalence estimates measured in the early morning as compared with the early evening, or for weekdays compared with weekend days, or for 7, 14, 21, or every 3rd day (total 7 days). Although there were also no differences in ICU–ventilator units, this lack of significant differences must be interpreted with caution due to the low statistical power of these tests.

Theoretically, one observation for each unit should be sufficient for determining the prevalence and type of restraint use, if the day was randomly selected. However, the fluctuation in patient composition, staffing, external factors (e.g., seasonal illnesses, holidays, etc.), make it necessary to sample multiple days and take the mean of repeated observations to obtain a more stable and representative estimate for each unit.

Our data suggest that the duration of the observation period should be adjusted for the type of unit. The prevalence estimate did not fluctuate on units with low restraint use, but fluctuated on high use units until about day 17 in 1998 and day 12 in 1997. The analyses presented here of increasing number of consecutive days indicate that a few days of observation in medical–surgical units might be sufficient, while a minimum of 12 days might be necessary for ICU and ventilator units to obtain a stable prevalence estimate.

We had expected to find higher rates of prevalence in the early morning period that includes restraints used overnight, and on the weekend days due to different staffing, activities, and visitor patterns. Other researchers have found that weekend days independently increased the risk for physical restraint use (Bourbonniere et al., 2003). There were also no differences in mean prevalence for the differing periods (7, 14, and 21) of consecutive days and for 7 nonconsecutive days on medical–surgical units where as few as 7 days yielded prevalence estimates that were not significantly different from a full 21 days. These differences may be meaningful for the ICU–ventilator units, but a much larger number of units would have to be studied to have adequate power to evaluate this.

There is no gold standard for measuring restraint prevalence. Methods required to obtain accurate estimates, such as more

frequent observation periods, are not realistic in most hospitals. More feasible methods of having unit staff record restraint use, as used in many studies (Table 1), may result in less accurate, and possibly biased, estimates because observers may not be objective or burdened by competing demands. We used triangulation of measurement and twice daily collection of data to increase the sensitivity of measurement, and collected data on a daily basis, including weekends, to obtain more accurate data. Using more than one method allowed for compensation for the limitations of each of the three methods of data collection. Different methods may also be needed for measuring prevalence in a long-term care setting, due to the typically less dynamic population than the acute care inpatient setting, different patient mix, and longer length of stay.

Hospitals may also choose to conduct substudies as part of a prevalence study that are specific to their needs. This can efficiently provide data using one seamless field operation. For example, two substudies that we conducted were: (a) a longitudinal study following individual patients throughout their hospitalization to determine risk factors for restraint use, type of restraint used, and duration of restraint use (Minnick et al., 1998); and (b) a quality monitoring study to determine whether correct documentation was in the medical record when a restraint was used. Additional details on these substudies, including the forms used, are available from the corresponding author.

Strengths and Limitations

There were several methodological strengths of this study. The focus of hospital and nursing administration on reducing restraint use raises the concern that unit staff might not be unbiased observers. We used impartial study staff to observe restraint use and maintained a strict division between the study observers and unit staff. This avoided the limitations of previous studies in which unit staff, busy with their usual responsibilities and subject to problems both with recall and recall bias, collected data, and increased the likelihood of obtaining unbiased prevalence rates. Triangulation of measurement using observation by study staff, nurse interview, and chart review increased the sensitivity of measuring restraint use. Conducting the study for 21 consecutive days, and having two daily observation periods in the first year allowed us to evaluate whether there were differences by time of day, day of the week, and duration of observation period. Our study was conducted in 1997 and in 1998, but based on our literature review on measuring the prevalence of physical restraint use on acute inpatient units that included publications through the end of 2005, the method we describe was the most rigorous.

Data for this study were from a single hospital. Hospitals that are different in size, patient mix and turnover, staff to patient ratio, type of staffing, have different practices regarding restraint use, and nonteaching hospitals may have different findings. It was not feasible to compare prevalence estimates based on direct observation, nurse report, and medical record due to the data entry method. Future studies should test the measurement methods that produce the most accurate estimates of prevalence of restraint use, including source of information on restraint use, comparison of retrospective and prospective measurement, and the optimal number of days and interval between days of observation, and considering type of unit and patient population. Although these data are a decade old, the current prevalence rate is not well documented (Minnick et al., 2007) and our findings on methodology for measuring physical restraint use remain relevant.

CONCLUSION

Efficient and periodic monitoring of restraint use that is not burdensome to staff is essential for maintaining restraint quality management. A brief period of direct observation by trained observers, supplemented by nurse report, results in accurate assessment. This finding should reduce the cost and burden to staff of documenting restraint use. Accurate measurement of physical restraint prevalence is essential for: complying with regulatory standards, understanding who is getting restrained, the pattern of restraint use, and for evaluating the effectiveness of restraint reduction interventions. These continue to be important factors in improving quality of care for older patients.

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