Falls in Newly Admitted Nursing Home Residents: A National Study

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Abstract

OBJECTIVES—To examine the relationship between nursing home (NH) organizational characteristics and falls in newly admitted NH residents.

DESIGN—Observational cross-sectional study from January 1, 2006, to December 31, 2006.

SETTING—NHs in the United States in 2006.

PARTICIPANTS—Individuals (n = 230,730) admitted to a NH in 2006 without a prior NH stay and with a follow-up Minimum Data Set (MDS) assessment completed 30 days or more after admission.

MEASUREMENTS—The relationship between experiencing a fall noted on the MDS assessment and NH characteristics (e.g., staffing, profit and chain status, religious affiliation, hospital-based facility status, number of beds, presence of a special care unit, funding) was examined, adjusting for NH resident characteristics.

RESULTS—Twenty-one percent of this cohort (n = 47,750) had experienced at least one fall in the NH at the time of the MDS assessment, which was completed for newly admitted NH residents who had at least a 30-day stay. NHs with higher certified nursing assistant (CNA) staffing had lower rates of falls (adjusted odds ratio = 0.97, 95% confidence interval = 0.95–0.99).

CONCLUSION—For newly admitted NH residents, NHs with higher CNA staffing had a lower fall rate. In an effort to maximize fall prevention efforts, further research is needed to understand the relationship between CNA staffing and falls in this NH population.

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Keywords

falls; nursing home; quality

Falls of nursing home (NH) residents have been associated with greater morbidity, mortality, and healthcare costs.[1–4] The Centers for Medicare and Medicaid Services reports fall rates as a NH quality indicator. Risk factors for falling in older adults living in NHs include functional status decline, the number and type of medications, medical conditions, vision and hearing impairments, cognition, and the use of adaptive equipment (cane, walker, wheel-chair) and restraints.[5–11]

Previous research provides estimates of fall rates within various NH facilities.[5,8,10,11] Estimates of falls among long-stay NH residents ranged from 29% in Washington State[8] to 39% among VA patients.[11] Alternatively, studies have examined falls among NH residents residing in facilities in other countries.[6,7,9] Despite the data obtained in previous studies, the fall rate of newly admitted NH residents has been inadequately characterized.

NHs in the U.S. consist of both short-stay residents, most of whom are admitted for post-acute care under their Medicare Part A benefit, and long-stay residents who receive custodial care.[12] Unlike long-stay care residents who have been residing in a NH for an extended period of time, newly admitted NH residents are admitted to an unfamiliar environment and are not well known to the staff, which makes the identification and management of fall risk more challenging in this population. In addition, many of those admitted following an acute care event are at increased risk of a fall due to diminished functional status. Study results may be biased by integrating both long-stay residents and short-stay residents in a study sample.

There has been substantial work examining the relationship between NH organizational characteristics, quality of care, and resident outcomes among long-stay NH residents.[13–20] Little is known about these relationships among newly admitted residents. The objectives of this study are to identify the rate of falls among newly admitted NH residents and to examine the relationship between NH organizational characteristics and falls in this vulnerable population.

METHODS

Sample

The cohort for this study included individuals experiencing their first NH admission between January 1, 2006 and December 31, 2006 in the United States Resident characteristics were obtained from the NH residential assessment Minimum Data Set (MDS), which is mandated for use in all Medicare/Medicaid certified U.S. NHs. The MDS is a multifaceted, standardized tool used in NHs to screen and assess residents based on physical, psychological, and psychosocial functioning. Facility characteristics were obtained from the Online Survey, Certification and Reporting (OSCAR) database. The OSCAR database consists of data collected by state surveyors, contracted by the Centers for Medicare and Medicaid Services, during the annual inspection of NHs. Participation in the annual survey is required by NHs seeking annual certification in Medicare and Medicaid programs.

A total of 385,545 residents were identified as having their first-NH admission in 2006. A 6-year look back period was used to verify whether there was a previous NH admission. Because the MDS measures falls within the past 30 days, and it was our objective to identify

falls occurring since NH admission, individuals who did not receive a 30-day post-admission MDS assessment were excluded (n = 111,524). The included residents (n = 274,021) resided in 15,350 NHs. Establishing a relationship between organizational characteristics and fall rates in facilities with low admission rates may lead to unreliable results. Furthermore, these facilities may have a different resident composition from facilities with higher admission rates. Therefore, residents from NHs in the lowest 10% of the sample distribution (i.e., fewer than 13 admissions in the calendar year) were excluded (n = 35,220). An additional 8,251 residents were excluded due to missing data (e.g., body mass index). The final analytic sample consisted of 230,730 newly admitted NH residents in 9,738 NHs in the United States in 2006.

Measures

Outcome Measure—A fall in the past 30 days was identified using the first MDS assessment occurring 30 days or more after the admission MDS assessment. The type of MDS assessment utilized as follow-up assessment included a quarterly assessment, a change in status MDS assessment, or post-admission assessment required of a skilled nursing facility (SNF) dated at least 30 days after admission. The median time from admission to the first assessment at least 30 days after admission was 53 days, with an interquartile range of (44–85 days). The occurrence of a fall was operationalized as a dichotomous variable indicating whether at least one fall did or did not occur in the previous 30 days.

Resident Characteristics—Individual level characteristics were identified using the admission MDS assessment which included socio-demographic characteristics (age, sex, race), an indicator of the individual utilizing their Medicare Part A insurance at the time of the admission, and characteristics associated with fall risk. Guided by previous research,[1,2,8,10,11] resident-level fall risk characteristics included medical diagnoses, body mass index (BMI), presence of daily pain, syncope, dizziness, the 28-point activity of daily living (ADL) score, daily restraints, and indication of the individual being bed-bound. Cognition was defined using the cognitive performance scale (CPS score), which ranges from 0 = intact to 6 = very severe cognitive impairment.[8,21] Fall history has been identified in previous research as a predictor of future falls.[8] Fall history was operationalized using the admission MDS measure for a resident having a fall(s) in the 30 days prior to the NH admission. The number of medications as well as certain classes of medications have been associated with increased fall risk.[2,6,22,23] Therefore, the number of medications taken in the previous 7 days as well as certain types of medications (anti-anxiety medications, antidepressants, diuretics, hypnotics, and antipsychotic medications) were included in the model. The use of adaptive equipment for mobility in the previous 7 days was operationalized to indicate use of any device, such as cane, walker, or crutch, for mobility. Impaired balance and limitations in range of motion of the feet and legs were also included as covariates.

NH Characteristics—To examine the relationship between facility characteristics and the occurrence of falls among this cohort, organizational characteristics that have been associated with quality of care in previous research were included in the model.[13–20] The facility size (total number of beds), administrative characteristics (religious affiliation, hospital-based facility), funding sources (% Medicare, % Medicaid), presence of a nurse practitioner (NP) or physician assistant (PA), and indication of any special care unit were included in the model.

NHs utilize registered nurses (RNs), licensed practical nurses (LPNs) and certified nursing assistants (CNA) to provide care to the residents. The CNAs provide the majority of personal care assistance (e.g., bathing, dressing, toileting) to the residents in the NH on a

daily basis.[24] In the United States, training requirements differ across these nursing careers: RNs and LPNs must complete a formal academic program; CNAs have more-modest educational requirements, with 75 hours mandated by the federal government and some states requiring more extensive training.[25] Nursing staff levels were operationalized by hours per resident per day (i.e., registered nurse [RN] and licensed practical nurse [LPN] hours per resident per day, certified nursing assistant [CNA] hours per resident per day). Indicators of a NH's profit status (for-profit or non-profit) and chain status (independently owned or chain affiliated) were obtained from the OSCAR file to categorize all NHs. NHs were classified as (i) nonprofit, independently owned, (ii) nonprofit, chain affiliated, (iii) for-profit, independently owned, or (iv) for-profit, chain affiliated.

Resident turnover rate was identified by the number of admissions per bed for the calendar year. The number of admissions per bed was not limited to a count of individuals in the cohort who had never been in a NH before, but included all individuals admitted to the facility in that year (e.g., residents admitted from another NH, short-stay post-acute care admissions). Individual-level data were aggregated at the facility level to calculate the total number of first-ever admitted NH residents in 2006 and the proportion of falls that occurred among the cohort in each facility during the initial follow-up assessment period.

Analysis

Descriptive characteristics were calculated for baseline resident characteristics, facility aggregate fall characteristics, and the organizational characteristics of the NH. Multivariate logistic regression was used to predict fall risk based on baseline resident characteristics, adjusted for sociodemographic and fall risk factors (Table 2). An inclusive approach was taken with the utilization of fall risk factors incorporated into the final model (presented in Table 3) in order to control for all individual factors that may contribute to fall risk. Resident-level fall risk factors, in the multilevel random effects model were included based on previous research, which found a positive relationship between medical diagnoses, fall history, incontinence, dizziness, syncope, medications, cognition, wandering, functional status, and restraints.[1,2,8,10,11] Resident-level characteristics included in the model were examined for colinearity. To examine the relationship between organizational characteristics and the occurrence of a fall among newly admitted NH residents, a multilevel logistic random effects multivariate model was used. This model enables control for correlation among NH residents clustered within the same facility that may arise from shared, unmeasured NH characteristics (e.g., high-gloss floors).

RESULTS

Sample Characteristics

NH characteristics are presented in Table 1. Twenty-one percent of these individuals who had never been in a NH before and remained in the facility at least 30 days experienced a fall after admission to the facility, as indicated in the follow-up assessment (median time to follow-up assessment 53 days). Among the 9,738 NHs in the sample, the average facility had 130 (±66) beds, and included 1.1 (±0.5) hours per resident per day of combined RN and LPN care, and 2.2 (±0.8) CNA hours per resident per day. The NHs in the cohort were predominantly for-profit, chain affiliated facilities (46.6%).

Table 2 presents the resident-level characteristics. The majority of the cohort was admitted to the facility under their skilled Medicare Part A insurance benefit (70.6%). Upon admission, 40.2% of the cohort was identified as having a history of falling. The cohort was predominantly female (64.1%), white (81.5%), with a mean age 78.9 (±12.2) years. On the admission MDS, 29.1% of residents had diabetes mellitus, 17.3% had a diagnosis of a

cerebrovascular accident (CVA), and 8.2% had a diagnosis of a hip fracture. One-third of individuals used a cane, walker, or crutch for mobility in the previous 7 days, and 18.2% had urinary incontinence. Fall history (adjusted odds ratio (AOR) = 2.31; 95% CI 2.26–2.37), medical diagnoses (e.g., CVA, AOR = 1.09; 95% CI 1.06–1.12), poor cognition (high CPS score AOR = 1.35; 95% CI 1.29–141), use of cane or walker (AOR = 1.20; 95% CI 1.17–1.23), and impaired balance (AOR = 1.33; 95% CI 1.27–1.40) were associated with a higher risk of a fall. Similarly, for every additional medication taken the odds of a fall increased 1%, with the average resident in the cohort taking 10.1 (±4.6) medications.

Table 3 presents the multivariate multilevel random effects analysis examining the relationship between organizational characteristics and falls among this cohort. CNA staffing and for-profit, independently owned facilities were associated with lower odds of a fall. RN/LPN staffing was not significant in predicting falls among this cohort. For every 1-hour increase in CNA hours per resident per day, there was a 3% decrease in the odds of a fall (AOR = 0.97; 95% CI 0.95–0.99) among this cohort. For-profit, independently owned facilities were associated with lower odds of a fall occurring (AOR = 0.91; 95% CI 0.87–0.95) compared with an otherwise similar individual admitted to a nonprofit, independently owned facility.

In light of the finding in the multivariate random effects model that identified a relationship between for-profit, independently owned facilities and falls, an additional descriptive analysis was conducted to examine differences in baseline characteristics of individuals admitted to each of these types of facilities. Admission characteristics of residents admitted to for-profit, independently owned NHs were compared with other profit and chain affiliated categories (nonprofit, independently owned, nonprofit, chain affiliated, and for-profit, chain affiliated) included in the model. For-profit, independently owned facilities had a higher percentage of Medicaid recipients, a lower proportion of newly admitted residents with a history of falling prior to the admission, younger residents, and residents who were taking fewer medications.

DISCUSSION

One in five newly admitted NH residents suffered at least one fall. Those residents admitted to a NH with higher CNA staffing had a lower risk of falls. To our knowledge, this is the first study to document the rate of falls among newly admitted NH residents. Unlike long-stay residents who are better known by staff, this cohort is predominantly comprised of post-acute care residents receiving skilled services who are mainly short-stay NH residents with a plan for returning home.[12] The occurrence of a fall among this cohort not only has short-term consequences (e.g., risk of injury, rehospitalization) but also may decrease their likelihood of returning home. Given the high rate of falls and associated morbidity,[1–4,26–28] study results suggest the importance of intervening to prevent falls among newly admitted NH residents, including higher CNA staffing for NH residents at higher risk of falls.

Only CNA staffing was associated with a decrease in fall risk. Facilities with higher CNA staffing were associated with fewer falls. The size of the effect is modest, and further research is needed to better understand the observed association. CNAs provide the majority of hands-on care to residents in the NH. They are the care providers who are present during activities that potentially have the greatest risk of a fall (e.g., toileting and transfers) and, therefore, are in the position to minimize fall risk by providing the required assistance during the at-risk activity. Thus, it is possible that increasing CNA staffing to provide assistance in transfers and ambulation could potentially prevent falls. The relationship between higher staffing and falls is consistent with past studies, which have found that higher staffing is associated with improved quality of care,[16,17] including resident nutrition

at meals,[29] lower rates of incontinence,[30] and lower rates of pressure ulcers.[30,31] Future research is needed to examine the relationship between different care processes and falls in facilities with higher and lower CNA staffing.

Among the organizational characteristics of the NH, for-profit, independently owned NH status was associated with a lower fall risk. This finding is not consistent with previous studies which found for-profit and independently owned facilities are associated with poorer quality of care.[18,19] In the present study, NHs were required to have a minimum of 13 new admissions in 2006. Previous studies have predominantly focused on long-stay residents. Placing a facility-level requirement on the minimum number of new resident admissions may have resulted in a NH cohort with a greater emphasis on rehabilitation rather than chronic maintenance care. Additionally, the results may represent a selection bias that was not controlled for with the covariates included in the model. Individuals admitted to for-profit, independently owned facilities were younger, took fewer medications, and had fewer falls in the 30 days prior to admission, all indicators of lower fall risk.[9,10] Further research is needed to understand the relationship between profit and chain status and resident outcomes among this cohort.

Limitations

There are limitations that need to be acknowledged in interpretation of these findings. First, there is the potential for differences, by facility, in fall event(s) reporting. Second, this analysis is limited to an indication of at least one fall occurring, as specified on the MDS. Although the MDS indicator determines that there was a fall in the previous 30 days, no information was collected on the number of fall events that occurred in that time period or the exact time period within the previous 30 days when the fall occurred. Third, our analysis is limited to the available measures within the OSCAR and MDS database. It is possible that there are additional confounders (i.e., organizational and/or resident characteristics), which were not included in this observational study, that account for the observed associations. Additionally, it should be noted that this analysis is limited to those individuals who remained in the NH at least 30 days after their first NH admission. In order to attribute a fall to the NH and to use the MDS fall indicator, individuals discharged from the facility before 30 days were excluded. Therefore, this analysis was not able to include short-stay newly admitted residents who remained in the facility fewer than 30 days. Finally, as with any observational study, this analysis examines associations and may be limited by other unmeasured confounders. Despite these limitations, this is one of the first studies to report the association of organizational characteristics with the risk of a fall among this cohort.

In conclusion, falls are common events among newly admitted NH residents who remain in the facility at least 30 days. NHs with higher CNA staffing had a lower fall rate. Due to the high rate of falls among this cohort and the positive relationship between these events and morbidity and mortality, this NH population is an important group on which to target interventions focused on decreasing future falls, including further exploration of the role of CNA staffing.

Acknowledgments

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Table 1

Nursing Home (NH) Characteristics (N = 9,738)

Characteristic	Value
Resident aggregates	
Number of first-ever NH admissions in 2006, mean ± SD	30.8 ± 19.6
Experiencing at least one fall event at follow-up, %	21.0
Staffing	
Total registered nurse and licensed practical nurse hours per resident per day, mean ± SD	1.1 ± 0.5
Certified nursing assistant hours per resident per day, mean ± SD	2.2 ± 0.8
Physician assistant or nurse practitioner, %	32.9
Structure	
Number of beds, mean ± SD	130.8 ± 66.4
Special care unit, %	25.8
Profit and chain status, %	
Nonprofit, independently owned facility	17.9
Nonprofit, chain affiliated	10.4
For-profit, independently owned facility	25.1
For-profit, chain affiliated	46.6
Administrative characteristics, %	
Religious affiliation	4.7
Hospital based	3.3
Funding sources, %	
Medicare	15.2
Medicaid	62.3
Admissions per bed per year, mean ± SD	1.8 ± 1.4

SD = standard deviation.

Table 2

Resident Characteristics and Risk Factors for Falls in Newly Admitted Nursing Home Residents Remaining in the Facility for at Least 30 Days

Characteristic or Risk Factor	Resident Cohort			Unadjusted	Adjusted
	Total (n = 230,730)	Nonfallers (n = 182,980)	Fallers (n = 47,750)	OR (95% Confidence Interval)	
Time interval to follow-up assessment, mean ± SD	62.9 ± 26.2	63.4 ± 25.6	61.0 ± 28.4		
Age, mean ± SD	78.9 ± 12.2	78.5 ± 12.4	80.5 ± 10.9	1.01 (1.01–1.01)[a]	1.01 (1.01–1.01)[a]
Female, %	64.1	64.9	61.1	0.83 (0.81–0.85)[a]	0.79 (0.77–0.81)[a]
Race, %					
White (reference)	81.5	80.3	87.2		
Black	12.8	13.7	9.3	0.65 (0.63–0.67)[a]	0.81 (0.78–0.84)[a]
Hispanic	4	4.3	3	0.72 (0.67–0.76)[a]	0.80 (0.75–0.85)[a]
Other	1.7	1.7	1.5	0.86 (0.78–0.93)[a]	0.92 (0.84–1.01)
Medicare Part A, %	70.6	70.2	72.2	1.09 (1.06–1.12)[a]	1.00 (0.98–1.03)
Fall history, %	40.2	35.8	56.9	2.37 (2.32–2.42)[a]	2.31 (2.26–2.37)[a]
Comorbidity, %					
Diabetes mellitus	29.1	29.3	27.9	0.94 (0.92–0.97)[a]	1.09 (1.06–1.12)[a]
Cerebrovascular accident	17.3	17	18.1	1.09 (1.06–1.12)[a]	1.15 (1.12–1.19)[a]
Parkinson's disease	3.9	3.5	5.3	1.53 (1.46–1.61)[a]	1.24 (1.18–1.31)[a]
Cardiac dysrhythmia	12.1	11.8	13.2	1.10 (1.06–1.13)[a]	1.03 (1.00–1.07)[a]
Congestive heart failure	17.7	17.8	17.4	0.97 (0.94–0.99)[a]	1.03 (1.00–1.06)[a]
Hypertension	53.5	53.6	53.8	0.99 (0.97–1.01)	0.96 (0.94–0.98)[a]
Hypotension	1.1	1.1	1.3	1.16 (1.06–1.28)[a]	1.04 (0.95–1.15)
Arthritis	19.7	19.7	19.9	0.98 (0.95–1.01)	0.95 (0.92–0.98)[a]
Osteoporosis	11.2	11.2	11.5	1.00 (0.97–1.04)	0.92 (0.90–0.96)[a]
Hip fracture	8.2	8	9.2	1.16 (1.12–1.20)[a]	0.88 (0.84–0.92)[a]
Alzheimer's disease	11.9	11.5	13.8	1.21 (1.18–1.25)[a]	1.01 (0.97–1.04)
Dementia	23.1	22.2	27.2	1.30 (1.27–1.33)[a]	1.05 (1.02–1.07)[a]
Depression	26.8	26	29.8	1.20 (1.17–1.22)[a]	1.05 (1.02–1.08)[a]
Emphysema or chronic obstructive pulmonary disease	15.5	15.7	15.1	0.95 (0.92–0.97)[a]	0.97 (0.94–1.00)[a]
Diabetic retinopathy	0.4	0.4	0.4	0.87 (0.74–1.03)	1.00 (0.84–1.19)
Glaucoma	4.5	4.4	4.5	1.01 (0.96–1.06)	0.95 (0.90–1.00)[a]
Macular degeneration	2.7	2.6	3	1.11 (1.04–1.17)[a]	1.00 (0.94–1.07)
Cataracts	2.6	2.6	2.7	1.00 (0.94–1.06)	0.97 (0.90–1.03)

Characteristic or Risk Factor	Resident Cohort			Unadjusted	Adjusted
	Total (n = 230,730)	Nonfallers (n = 182,980)	Fallers (n = 47,750)	OR (95% Confidence Interval)	
Urinary tract infection	18.6	18.5	18.9	1.02 (0.99–1.04)	0.97 (0.94–1.00)[a]
Urinary incontinence	18.2	18.2	18.6	1.07 (1.04–1.10)[a]	0.97 (0.94–1.00)[a]
Symptoms in last 7 days, %					
Dizziness	1.6	1.4	2	1.22 (1.13–1.31)[a]	1.09 (1.01–1.17)[a]
Syncope	0.6	0.4	0.9	1.40 (1.25–1.57)[a]	1.09 (0.96–1.22)
Medications					
Number of medications, mean ± SD	10.1 ± 4.6	10.1 ± 4.6	10.2 ± 4.5	1.00 (1.00–1.00)[a]	1.01 (1.00–1.01)[a]
Antipsychotic medication, %	19.4	18.7	22.2	1.27 (1.24–1.30)[a]	1.07 (1.04–1.10)[a]
Anti-anxiety medication, %	16.7	15.6	20.3	1.37 (1.34–1.41)[a]	1.26 (1.22–1.29)[a]
Antidepressant, %	32.7	31.7	36.8	1.24 (1.22–1.27)[a]	1.18 (1.15–1.22)[a]
Diuretic, %	31.3	31.5	30.3	0.93 (0.91–0.95)[a]	0.97 (0.94–0.99)[a]
Hypnotic, %	8.5	8.4	8.9	1.07 (1.03–1.10)[a]	1.07 (1.03–1.11)[a]
Daily pain, %	20.1	20.4	18.9	0.88 (0.86–0.91)[a]	0.95 (0.92–0.97)[a]
Cognitive Performance Scale score, %					
0–2 (low) (reference)	54.6	56.8	46.4		
3–4 (moderate)	36.6	34.6	44.2	1.59 (1.56–1.63)[a]	1.38 (1.35–1.42)[a]
5–6 (high)	8.8	8.6	9.4	1.37 (1.32–1.42)[a]	1.35 (1.29–1.41)[a]
Wandering in last 7 days, %	9	8.2	12.1	1.53 (1.48–1.58)[a]	1.28 (1.24–1.33)[a]
Body mass index, kg/m^2, %					
<18.5	10.6	10.5		0.99 (0.96–1.03)	1.05 (1.01–1.08)[a]
18.5–30.0 (reference)	70.6	69.7	74		
>30.0	18.8	19.8	15.1	0.71 (0.69–0.73)[a]	0.83 (0.81–0.86)[a]
ADL (range 0–28), mean ± SD	16.3 ± 6.9	16.3 ± 7.1	16.6 ± 6.2	1.01 (1.01–1.01)[a]	1.00 (1.00–1.00)
Impaired balance, %	91.9	91.3	94.2	1.52 (1.46–1.59)[a]	1.33 (1.27–1.40)[a]
Bedbound, %	3.5	3.9	2.1	0.53 (0.50–0.57)[a]	0.66 (0.62–0.71)[a]
Uses a cane, crutch, walker, %	33.3	32.2	37.8	1.27 (1.24–1.29)[a]	1.20 (1.17–1.23)[a]
Range of motion, %					
Limited in lower extremity	30.2	30.9	27.8	0.86 (0.84–0.88)[a]	0.88 (0.86–0.91)[a]
Limited in feet	19.8	20.6	16.9	0.78 (0.76–0.80)[a]	0.93 (0.90–0.96)[a]
Restraints used daily in last 7 days, %	1.3	1.2	1.8	1.57 (1.44–1.70)[a]	1.04 (0.96–1.13)

Interpretation of continuous variables odds ratios (ORs): medication (adjusted model), for each additional medication per day there is a 1% increase in odds of a fall; activity of daily living (ADL) status in the unadjusted model can be interpreted as each additional unit increase in ADL score was associated with a 1% increase in odds of a fall.

SD=standard deviation.

[a]$P < .05$.

Table 3

Relationship Between Nursing Home Organizational Characteristics and Falls in the Nursing Home (n = 230,730)

Characteristic	Unadjusted	Adjusted
	Odds Ratio (95% Confidence Interval)	
Registered nurse and licensed practical nurse hours per resident per day	1.02 (0.99–1.05)	1.01 (0.98–1.04)
Certified nursing assistant hours per resident per day	1.01 (0.99–1.03)	0.97 (0.95–0.99)[a]
Physician assistant or nurse practitioner	1.00 (0.98–1.03)	1.01 (0.99–1.04)
Nonprofit, independently owned facility (reference)		
Nonprofit, chain-affiliated facility	1.08 (1.03–1.14)[a]	1.04 (0.99–1.09)
For-profit, independently owned facility	0.87 (0.84–0.91)[a]	0.91 (0.87–0.95)[b]
For-profit, chain-affiliated facility	0.97 (0.93–1.00)	0.98 (0.93–1.02)

The multivariate random effects logit analysis was adjusted for number of beds, number of admissions per bed per year, presence of a special care unit, hospital-based facility, religious affiliation, percentage Medicaid funding in facility, percentage Medicare funding in facility, and resident characteristics (age, sex, race, Medicare status, medical diagnosis (e.g., diabetes mellitus, Parkinson's, stroke, hip fracture, urinary tract infection, urinary incontinence), cognition (Cognitive Performance Scale score), wandering, body mass index, history of falling, medications (number of medications, indicator of classes of medications including use of psychotic, antidepressant, anti-anxiety, diuretic, hypnotic medications), functional status (28-point activity of daily living score and indicator of a balance limitation), use of a mobility aid (cane, walker, or crutch), presence of dizziness or syncope in last 7 days, being bed- bound, presence of pain daily, use of restraints daily, and presence of limitations in range of motion of legs or feet). Interpretation of significant continuous variables indicates a 1-hour increase in certified nursing assistant hours per resident per day is associated with a 3% lower risk of falling.

[a]$P < .05$.

[b]$P < .001$.