Original Article

Nursing Home Employee and Resident Satisfaction and Resident Care Outcomes

Bora Plaku-Alakbarova*, Laura Punnett, Rebecca J. Gore, Procare Research Team

Department of Work Environment & Center for the Promotion of Health in the New England Workplace (CPHNEW), University of Massachusetts Lowell, Lowell, MA, USA

ABSTRACT

Background: Nursing home resident care is an ongoing topic of public discussion, and there is great interest in improving the quality of resident care. This study investigated the association between nursing home employees' job satisfaction and residents' satisfaction with care and medical outcomes.
Methods: Employee and resident satisfaction were measured by questionnaire in 175 skilled nursing facilities in the eastern United States from 2005 to 2009. Facility-level data on residents' pressure ulcers, medically unexplained weight loss, and falls were obtained from the Centers for Medicare and Medicaid Services Long-Term Care Minimum Data Set. The association between employee satisfaction and resident satisfaction was examined with multiple and multilevel linear regression. Associations between employee satisfaction and the rates of pressure ulcers, weight loss, and falls were examined with simple and multilevel Poisson regression.
Results: A 1-point increase in overall employee satisfaction was associated with an increase of 17.4 points (scale 0–100) in the satisfaction of residents and family members ($p < 0.0001$) and a 19% decrease in the incidence of resident falls, weight loss, and pressure ulcers combined ($p < 0.0001$), after adjusting for staffing ratio and percentage of resident-days paid by Medicaid.
Conclusion: Job satisfaction of nursing home employees is associated with lower rates of resident injuries and higher resident satisfaction with care. A supportive work environment may help increase quality of care in the nation's nursing homes.

1. Introduction

The quality of resident care in US nursing homes has been a concern of public policy at least since the Omnibus Budget Reconciliation Act of 1987, when Congress tied quality of care to certification and reimbursement for Medicare and Medicaid. However, adverse resident outcomes remain an issue. In 2012, 11.3% of residents in Medicare/Medicaid-eligible nursing homes had had at least one fall since admission, and 5.4% were reported as having pressure ulcers [1]. Numerous indicators are used to track and compare quality of care. These fall broadly into three categories [2,3]: "structural" quality indicators represent institutional characteristics, such as the presence of written policies prohibiting resident abuse and neglect; "process" indicators relate to services provided directly to residents, such as regular action to prevent pressure ulcers; and "outcome" indicators reflect residents'

physical, mental, or emotional condition, such as medication errors and resident falls.

Structural indicators in particular have been studied in relation to resident outcomes. Adequate staffing is one example of obvious importance. Facility staffing levels have been linked to multiple resident health outcomes, including pressure ulcers [4,5]; falls [6]; hospitalization [5,7]; activities of daily living [5,8]; pain [4,5,8]; and others [5,9]. Nursing time per resident per day (which increases with staffing levels) was also associated with fewer pressure ulcers and other adverse outcomes [10]. Evidence of this relationship is less extensive in long-term care than in the hospital setting where, most dramatically, staffing has been linked to patient mortality [11,12].

Maintaining adequate staffing to ensure high quality of long-term care is a persistent problem [13] due to low pay, strenuous work, and other sources of job dissatisfaction [11,14–16]. One direct predictor of nursing home staffing levels is employee turnover rate

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* Corresponding author. Department of Work Environment & Center for the Promotion of Health in the New England Workplace (CPHNEW), University of Massachusetts Lowell, 1 University Ave, Lowell, MA 01854, USA.
E-mail address: alakbarova@outlook.com (B. Plaku-Alakbarova).

or its complement, retention. These have been studied in association with rehospitalization [17] and "quality of dying," defined as residents' distress due to symptoms and their perceptions of care [18]. Reflecting this overall dynamic, one evidence-based set of recommendations for nursing home selection addressed both staffing and turnover levels, as well as clinical quality indicators [19].

Adequate staffing levels are important not only to residents and patients of healthcare institutions but also to the caregivers themselves. Staffing levels have been linked to personnel's risk of needle-stick injury [20] and higher work stress [21]. Effectiveness of a safe resident handling program to reduce employee back injuries was higher in facilities with lower turnover of nursing aides, less perceived time pressure, and less use of temporary agency staff [22]. Insufficient staffing may also be a risk factor for higher risk of assault in long-term care facilities [23].

More broadly, residents and employees share the same environment and many potentially hazardous factors in that environment, ranging from communicable diseases to interpersonal stress and risk of assault. Therefore, it is plausible to hypothesize that workplace stressors or hazards might negatively affect the ability of staff members to provide high-quality care.

However, only a very limited body of literature has examined associations between the nursing home worker's environment and process or care outcomes for residents. According to participants in 27 focus groups, nursing aides who felt stressed, rushed, unsupported, and undervalued by management linked their stressful work environment with suboptimal care for residents [24]. On the positive side, employee perceptions of a positive work climate and lower work stress levels have been associated with improved staff compliance with procedures, a process indicator with implications for resident safety [25]. In addition, the more the employees believe they have support, resources, and informal power in their organization, the higher their perceived ability to provide individualized care [26]. Staff perceptions of a supportive management were associated with fewer deficiency citations on inspection, [27,28] and employees' perceived control over work schedule was linked to fewer resident pressure ulcers [29]. Lastly, nursing home employee participation in decision-making has been associated with fewer pressure ulcers and deficiency citations [27], a decrease in residents' disruptive behavior [30], and higher overall quality of care [28,31].

As evidenced by the above review, most studies have defined quality of care in terms of medical outcomes such as falls, pressure ulcers, and activities of daily living, rather than residents' own expressed satisfaction with the care they receive. Williams et al [32] found that resident satisfaction was not adequately reflected in the five-star rating system of the Nursing Home Compare website, a system based on medical quality-of-care indicators. However, as a quality-of-care indicator, resident satisfaction complements medical outcomes, especially as more nursing homes are adopting culture-change models that go beyond meeting physical and medical needs and strive to improve residents' quality of life [33]. Bowers et al [34] suggested that resident satisfaction is not simply a direct reflection of the medical care but represents additional important dimensions of residents' nursing home experience, such as the closeness of their bond with caregivers or the presence of daily comforts in their lives.

To our knowledge, only one study has explicitly investigated the relationship between caregivers' working conditions and resident satisfaction in the nursing home setting. Bishop et al [35] reported that tangible job rewards, such as satisfaction with wages, benefits, and advancement possibilities, influenced nursing home workers' intent to stay, which in turn was associated with resident satisfaction.

The current study aimed to investigate the role of caregivers' work environment on three specific resident clinical outcomes: pressure ulcers, medically unexplained weight loss, and falls (with or without injury). In addition, it examined the association of workers' job satisfaction with resident satisfaction and with quality of care. We hypothesized that high employee satisfaction with working conditions would be associated with increased resident satisfaction with nursing care and the general environment, as well as with lower rates of adverse outcomes. By considering resident satisfaction in addition to common medical outcomes, we hope to expand the usual analyses between work environment and nursing home quality to include a more holistic definition of quality of care.

2. Materials and methods

The data were obtained through the study, "Promoting Physical and Mental Health of Caregivers through Transdisciplinary Intervention (ProCare)," conducted within a chain of over 200 skilled nursing facilities (SNFs) in the eastern United States belonging to a single company. Facility-level data were collected for the time period 2005−2009, during and after corporate implementation of a Safe Resident Handling Program [22].

The following characteristics were abstracted from corporate-wide datasets:

1. Counts of adverse medical incidents to residents
2. Ratings of resident satisfaction with specific aspects of the nursing home experience
3. Ratings of employee satisfaction with specific aspects of the work environment
4. Full-time equivalent (FTE) clinical staffing
5. Number of resident beds and occupancy rates
6. Percentage of resident-days paid from Medicare
7. Percentage of resident-days paid from Medicaid

All data were summed or averaged at the facility level. Most data were collected within the company, except for items #2 and #3, which were obtained from the National Research Corporation (see below) for SNFs within the company under study. Staff-to-resident ratios were calculated as the average annual FTE clinical staff hours worked per year, divided by the corresponding average annual resident-days divided by 365.25. Numbers of beds and occupancy rates were used to generate denominators for rates of adverse resident outcomes. Percentage of resident-days paid by Medicaid was selected for modeling; days paid by Medicare were excluded because these two variables were highly correlated (Spearman's r > −0.66 for each year). All metrics were computed for each year separately and for the entire 5-year study period.

2.1. Adverse resident outcomes

Annual counts of resident medical outcomes were prepared by the company for reporting to the Long-Term Care Minimum Data Set (MDS) [36]. The specific outcomes selected for this study were all resident falls, falls with injury, medically unexplained weight loss, and pressure (decubitus) ulcers. Annual rates were computed as the number of events divided by the number of resident-days in each SNF for the corresponding year. We also summed the counts of falls, weight loss, and pressure ulcers to compute a total rate of adverse resident outcomes per year per facility.

2.2. Resident satisfaction

The National Research Corporation is a third-party entity which distributes MyInnerview, an annual satisfaction survey

Table 1
Characteristics of 175 skilled nursing homes within a single corporation, 2005—2009

		2005—2009*	2005	2006	2007	2008	2009
No. of facilities[†]		175	133	109	109	148	167
Resident satisfaction	Mean (SD)	2.11 (0.22)	1.96 (0.45)	2.03 (0.38)	1.99 (0.34)	2.11 (0.36)	2.15 (0.26)
Family satisfaction		2.09 (0.17)	2.03 (0.21)	2.05 (0.21)	2.06 (0.22)	2.08 (0.21)	2.15 (0.19)
Resident and family satisfaction		2.10 (0.17)	2.03 (0.24)	2.04 (0.24)	2.03 (0.23)	2.09 (0.23)	2.15 (0.18)
Employee satisfaction							
Overall		1.70 (0.16)	1.60 (0.23)	1.61 (0.22)	1.66 (0.21)	1.68 (0.21)	1.75 (0.18)
Supervisor support		1.80 (0.16)	1.71 (0.23)	1.73 (0.23)	1.77 (0.23)	1.78 (0.21)	1.83 (0.19)
Respect and caregiving		1.70 (0.16)	1.67 (0.22)	1.63 (0.19)	1.66 (0.20)	1.67 (0.20)	1.73 (0.18)
Working conditions		1.76 (0.18)	1.65 (0.26)	1.67 (0.26)	1.73 (0.24)	1.75 (0.23)	1.82 (0.21)
Training		1.70 (0.17)	1.59 (0.24)	1.60 (0.22)	1.66 (0.22)	1.71 (0.22)	1.77 (0.19)
All resident injuries	Mean rate[‡] (SD)	892.3 (251.6)	858.4 (254.3)	909.2 (265.5)	923.4 (232.0)	908.4 (258.1)	873.6 (277.2)
Falls		646.3 (225.6)	623.9 (220.5)	663.0 (236.9)	656.9 (205.8)	658.7 (242.8)	632.0 (236.0)
Falls with injury		120.3 (75.4)	116.3 (71.4)	127.0 (74.5)	124.4 (76.7)	121.6 (82.8)	113.6 (79.9)
Unexplained weight loss		170.2 (52.6)	155.9 (57.2)	173.5 (69.6)	194.3 (80.6)	172.2 (73.2)	169.4 (77.0)
Pressure ulcers		75.8 (34.9)	78.7 (42.4)	72.7 (41.6)	72.2 (41.8)	77.5 (44.1)	72.2 (40.0)
Medicaid resident-days	Mean no. (% total)	133,745 (65.4)	27,724 (67.0)	26,995 (67.7)	27,008 (65.2)	27,865 (64.6)	27,884 (64.2)
FTE[§] **clinical staff**	Mean no.	384.7	80.8	78.7	76.7	79.3	82.6
	Mean rate[‖]	5.7	5.5	5.5	5.6	5.7	5.8

SD, standard deviation.
* 5-year average.
[†] Facilities with nonmissing data for all regression variables.
[‡] Rate per 100,000 resident-years.
[§] FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.
[‖] Rate in hours per resident-day.

administered to long-term care employees and nursing home residents [37]. The MyInnerview resident satisfaction survey included 24 items, categorized into four *a priori* subdomains: quality of life (10 items), quality of care (8 items), quality of service (4 items), and global satisfaction (2 items). Each item was scored on a scale of 0—3, representing "Poor," "Fair," "Good," and "Excellent." This survey was administered by mail to residents in a sample of US nursing homes each year. If residents were unable to complete it, the family members completed it instead. Nationally, family members make up between 65% and 89% of respondents [37].

To calculate a resident/family member satisfaction score for each facility, we averaged all survey items from each respondent to obtain an overall score. Then we computed a mean resident-only satisfaction score and a mean family-member satisfaction score for each facility for each year and also for the entire 5-year period. These two were averaged to obtain the outcome of interest, the satisfaction score for residents and family members combined. By averaging the scores of family members and residents separately before taking a pooled mean, we weighted equally the opinions of each group in a data set where family respondents greatly outnumbered residents. We also conducted alternate analyses using the satisfaction scores for residents and family members separately. In each analysis, the final outcome variable was rescaled to a range of 0—100.

2.3. Employee satisfaction

The employee satisfaction survey included 21 items, categorized into five *a priori* subdomains: training (4 items), work environment (9 items), supervision (3 items), management (2 items), and global satisfaction (3 items). Again, each item was scored on a scale of 0—3, representing "Poor," "Fair," "Good," and "Excellent." This survey was mailed annually to a sample of US nursing homes, which then distributed it to all nonagency staff. Completed surveys were anonymous and returned by mail directly to MyInnerview. Nationally, respondents held a variety of staff positions: in 2009, there were 283,404 responses, of which 54,094 (19%) came from nurses, 114,490 (40%) from nursing assistants, and 114,820 (41%) from other staff. This last category included staff in housekeeping, laundry, maintenance, food service, administration, social services

and activities, and all other positions [37]. To calculate an overall employee satisfaction score for each facility, we averaged the responses to all survey items from each individual survey and then averaged these scores by facility.

In addition, facility-level mean satisfaction scores for various subdomains of employee satisfaction were calculated. Factor analysis was used to examine the empirical associations among the employee survey items to determine whether or not the *a priori* subdomains would be retained or restructured to represent discrete subdomains of satisfaction. Varimax orthogonal rotation was selected to maximize independence of the resulting empirical factors and reduce potential collinearity in subsequent regression modeling. Based on the factor analysis, each survey item was grouped into one of four empirical factors according to its highest loading. Survey items were excluded if the loadings on all factors were less than 0.4. Cronbach α were calculated for all four empirical subdomains.

2.4. Regression modeling

Multiple linear regression was used to test the association between average employee satisfaction and average resident satisfaction over the entire 5-year period, controlling for staff-to-resident ratios and percentage of resident-days paid by Medicaid.

To test the within-year association between employee satisfaction and resident satisfaction, we used multilevel linear regression (restricted maximum likelihood estimation) with facility as the second-level variable and a compound symmetry covariance matrix between observations in the same facility. The effects of year, employee satisfaction, staff-to-resident ratios, and percentage of resident-days paid from Medicaid were fixed; the group intercepts were allowed to vary randomly.

Poisson regression was used to test the associations between average employee satisfaction and the average rate of adverse resident outcomes (falls, weight loss, pressure ulcers, and a combination of the three). Multilevel Poisson regression models with facility as the second-level variable tested the within-year association between employee satisfaction and adverse resident outcome rates, controlling for year, staff-to-resident ratios, and percentage of resident-days paid from Medicaid.

Table 2
Factor analysis (orthogonal varimax rotation): Employee satisfaction surveys, 2005−09

Item No.	Item Description (A PRIORI DOMAIN)	Supervisor support	Respect and caregiving	Working conditions/ management cares/ global	Training
Q6	Care (concern) of supervisor (SUPERVSN)	0.84236	0.18781	0.24134	0.17221
Q7	Appreciation of supervisor (SUPERVSN)	0.85147	0.15777	0.27297	0.17465
Q8	Communication by supervisor (SUPERVSN)	0.78737	0.21639	0.24558	0.23537
Q9	Attentiveness of management (MNGMT)	0.40117	0.20120	0.65713	0.30377
Q10	Care (concern) of management (MNGMT)	0.40526	0.23298	0.65952	0.29911
Q15	Fairness of evaluations (WORK ENV)	0.47008	0.37135	0.34602	0.17120
Q16	Respectfulness of staff (WORK ENV)	0.07740	0.75245	0.13314	0.16309
Q14	Quality of teamwork (WORK ENV)	0.20066	0.58004	0.32726	0.03181
Q13	Sense of accomplishment (WORK ENV)	0.27145	0.64306	0.00808	0.26604
Q11	Safety of workplace (WORK ENV)	0.17437	0.50541	0.35418	0.35645
Q17	Assistance with stress (WORK ENV)	0.31658	0.25482	0.58401	0.36389
Q5	Comparison of pay (WORK ENV)	0.16051	0.07052	0.69507	0.14435
Q18	Staff-to-staff communication (WORK ENV)	0.14560	0.37826	0.53275	0.21069
Q12	Adequacy of equipment/supplies (WORK ENV)	0.17421	0.40678	0.40578*	0.33450
Q21	Recommendation for care (GLOBAL SATISF)	0.14962	0.61656	0.43341	0.24447
Q20	Recommendation for job (GLOBAL SATISF)	0.29550	0.46231	0.59657	0.27826
Q19	Overall satisfaction (GLOBAL SATISF)	0.31861	0.44590	0.60928	0.28520
Q3	Quality of resident-related training (TRAIN)	0.18100	0.13683	0.30606	0.79474
Q4	Quality of family-related training (TRAIN)	0.18378	0.09667	0.36192	0.75748
Q2	Quality of in-service training (TRAIN)	0.16201	0.29057	0.08340	0.73566
Q1	Quality of orientation (TRAIN)	0.18029	0.28863	0.22200	0.63220

* This loaded approximately equally on two factors. It was assigned to "Working conditions/ management cares/ global" based on appropriateness and context.

Assumptions of linearity and normality of errors were checked in linear models; in the multilevel linear models, distributions of level-two residuals were generated. The variances of level-one residuals within each level-two unit were judged to be uninformative due to the small number of observations within each facility. All analyses were conducted in SAS/STAT 12.1 [38].

3. Results

The data set for the entire period, 2005−2009, included 175 unique facilities with nonmissing data (Table 1). The mean combined 5-year resident and family satisfaction score was 2.11, varying slightly from a low of 1.96 in 2005 to a high of 2.15 in 2009. On a

Table 3
Regression models of center-level resident/family satisfaction score (0−100): Ordinary least square regression (OLS) of 5-year scores; multilevel linear (ML) regression* of yearly scores, with center as the second-level variable

Variable	Mean satisfaction, residents only (2005−09, OLS) Model 3a		Mean satisfaction, family only (2005−09, OLS) Model 3b		Combined satisfaction, resident/family (2005−09, OLS) Model 3c		Combined satisfaction, resident/family (yearly, ML) Model 3d	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Overall employee satisfaction	16.49 (3.12)	<0.0001	18.32 (2.21)	<0.0001	17.41 (2.13)	<0.0001	7.43 (1.44)	<0.0001
FTE‡ clinical hours/resident-day	0.92 (0.51)	0.0708	0.10 (0.36)	0.7724	0.52 (0.35)	0.1370	0.36 (0.43)	0.3970
% Medicaid days	−10.23 (4.74)	0.0324	−8.90 (3.37)	0.0090	−9.57 (3.25)	0.0037	−10.02 (3.21)	0.0019
Year							0.52 (0.16)	0.0011
Model statistics	$F(3, 170) = 14.93, p < 0.0001$ $R^2 = 0.209$		$F(3, 171) = 30.12, p < 0.0001$ $R^2 = 0.346$		$F(3, 171) = 31.68, p < 0.0001$ $R^2 = 0.357$		*-2 Res LL† = 4347.3* *Null model LR: X² (2) = 99.1* *p < 0.0001*	

SE, standard error.
* ML method of estimation, Compound Symmetry covariance structure.
† Null Model Likelihood Ratio Test: -2 Restricted Log Likelihood.
‡ FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.

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scale of 0—3, this corresponds to between "Good" and "Excellent." Mean employee satisfaction scores were lower than those of residents, averaging 1.70 (between "Fair" and "Good") during 2005—2009 (Table 1).

For 2005—2009, the mean facility rate of adverse resident outcomes (falls, unexpected weight loss, or pressure ulcers) was 892 per 100,000 resident-years, ranging from a low of 858 per 100,000 in 2005 to a high of 923 per 100,000 in 2007 (Table 1). Falls comprised the majority (on average, 646 per 100,000 during 2005—2009) and pressure ulcers the smallest portion of these incidents (76 per 100,000).

3.1. Employee satisfaction factor analysis

The employee satisfaction scores yielded four empirical factors (Table 2) that differed from the *a priori* subdomains. These empirical factors were as follows:

- *Supervisor support*: supervisors' appreciation for employees, care and concern, communication with employees, and fair evaluations.
- *Respect and caregiving*: respectfulness of staff, quality of teamwork, sense of accomplishment, workplace safety, and employees' willingness to recommend the facility for care.
- *Working conditions*: attentiveness and care of management, assistance with stress, satisfaction with comparison of pay, staff-to-staff communication, adequacy of the equipment/supplies, and overall satisfaction and employees' willingness to recommend the job to others.
- *Training*: quality of staff training and orientation.

One item, adequacy of equipment/supplies, loaded equally on two different factors (*Working conditions/management cares/global* and *Respect and caregiving*) and was assigned to the former factor, based on our judgment of higher face validity (Table 2). Cronbach α coefficients for all four empirical subdomains were above 0.73, indicating good internal consistency.

3.2. Resident satisfaction models

Employee satisfaction was strongly correlated with resident satisfaction in all models (Tables 3—5). For the 5-year average ratings, a one-point increase in overall employee satisfaction implied an increase of about 17.4 points in the 0—100 satisfaction scale for residents and family members (corresponding to a one-half point increase in the original 0—3 scale), after adjusting for staffing ratio

and percentage of resident-days paid from Medicaid (Table 3, model 3c). In the subdomain analysis, the strongest predictor of mean resident satisfaction over the 5-year period was employee satisfaction with the "working conditions" factor (Table 4, model 4c).

In the yearly multilevel models, a one-point increase in overall employee satisfaction produced an increase of 7.4 points in the rescaled 0—100 resident/family satisfaction scale (corresponding to about one-quarter point increase in the original 0—3 scale), after controlling for the effects of year, staffing ratios, and percentage of resident-days paid from Medicaid (Table 3, model 3d). As in the 5-year summary models, employee satisfaction with "working conditions" showed the strongest association with resident and family satisfaction (Table 5, model 5c).

Among the remaining predictors, a higher proportion of Medicaid days was consistently associated with lower resident and family satisfaction, whereas a higher staffing ratio predicted a small, but for the most part nonsignificant, increase in resident and family satisfaction (Tables 3—5).

3.3. Resident injury models

During the entire 5-year period, a one-point increase in overall employee satisfaction was associated with a 19% decrease in the incidence of all resident injuries combined—falls with and without injury, weight loss, and pressure ulcers—after adjusting for staffing ratio and percent Medicaid days (Table 6, model 6a). The rate of pressure ulcers showed the strongest effect, with a one-point increase in overall employee satisfaction corresponding to a 55% decrease in incidence (Table 6, model 6e). A one-point increase in employee satisfaction was associated with a 21% reduction in incidence of medically unexplained weight loss (Table 6, model 6d) and a 12% reduction in incidence of all falls, the most common outcome (Table 6, model 6b). On the other hand, a one-point increase in employee satisfaction represented a 17% increase in occurrence of falls with minor or major injuries, which represented about 18% of all falls (Table 6, model 6c).

In the yearly models, higher employee satisfaction remained associated with a reduction in incidence of all injuries combined, all falls, medically unexplained weight loss, and pressure ulcers, though the magnitude of the protective effects for pressure ulcers and weight loss decreased somewhat (Table 7). Of note, the previous association between higher employee satisfaction and higher rate of falls with injury was reduced to nonsignificance (Table 7, model 7c).

Table 4
Regression models of center-level resident/family satisfaction score (0—100) on subdomains of employee satisfaction: Ordinary least square (OLS) regression of 5-year scores

Model	Variables	Combined resident/family satisfaction		
		2005—2009, OLS		
		B (SE)	p	Model statistics
4a	Employee satisfaction with supervisor support FTE* hours/resident-day % Medicaid days	13.46 (2.23) 0.38 (0.37) −11.96 (3.44)	<0.0001 0.3055 0.0006	$F (3, 171) = 20.46$, $p < 0.0001$ $R^2 = 0.264$
4b	Employee satisfaction with respect and caregiving FTE* hours/resident-day % Medicaid days	14.96 (2.32) 0.23 (0.37) −11.40 (3.40)	<0.0001 0.5366 0.0010	$F (3, 171) = 22.43$, $p < 0.0001$ $R^2 = 0.282$
4c	Employee satisfaction with working conditions/management cares/global FTE* hours/resident-day % Medicaid days	16.05 (1.89) 0.47 (0.34) −7.45 (3.27)	<0.0001 0.1716 0.0238	$F (3, 171) = 33.84$, $p < 0.0001$ $R^2 = 0.373$
4d	Employee satisfaction with training FTE* hours/resident-day % Medicaid days	14.85 (2.13) 0.92 (0.37) −12.72 (3.31)	<0.0001 0.0133 0.0002	$F (3, 171) = 25.06$, $p < 0.0001$ $R^2 = 0.305$

* FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.

Table 5
Regression models of center-level resident/family satisfaction score (0−100) on subdomains of employee satisfaction: Multilevel linear (ML) regression* of annual scores, with center as second-level variable

| | | Combined resident/family satisfaction | | |
| | | Yearly, ML | | |
Model	Variables	B (SE)	p	Model statistics
5a	Employee satisfaction with supervisor support FTE‡ hours/resident-day % Medicaid days Year	4.06 (1.35) 0.36 (0.43) −10.02 (3.21) 0.65 (0.15)	0.0028 0.3524 0.0013 <0.0001	-2 Res LL† = 4361.7 Null LR: X^2 (2) = 126.9 p < 0.0001
5b	Employee satisfaction with respect and caregiving FTE‡ hours/resident-day % Medicaid days Year	5.71 (1.49) 0.37 (0.44) −10.08 (3.30) 0.68 (0.15)	0.0001 0.4001 0.0024 <0.0001	-2 Res LL† = 4356.8 Null LR: X^2 (2) = 118.6 p < 0.0001
5c	Employee satisfaction with working conditions/management cares/global FTE‡ hours/resident-day % Medicaid days Year	7.28 (1.26)‡ 0.32 (0.42) −9.37 (3.18)‡ 0.50 (0.16)‡	<0.0001 0.4552 0.0034 0.0015	-2 Res LL† = 4341.8 Null LR: $X2$ (2) = 94.3 p < 0.0001
5d	Employee satisfaction with training FTE‡ hours/resident-day % Medicaid days Year	5.54 (1.34)‡ 0.46 (0.43) −10.79 (3.27)‡ 0.49 (0.16)‡	<0.0001 0.2936 0.0011 0.0025	-2 Res LL† = 4354.6 Null LR: X^2 (2) = 118.0 p < 0.0001

*　ML method of estimation, Compound Symmetry covariance structure.
†　Null Model Likelihood Ratio Test: -2 Restricted Log Likelihood.
‡　FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.

Percent Medicaid days were significantly associated with steep decreases in incidence of all injuries combined, falls with injury, weight loss, and pressure ulcers in the 5-year models (Table 6, models 6a, 6c, 6d and 6e) and with milder but still significant decreases in incidence of all injuries combined and all falls in the yearly models (Table 7, models 7a and 7b). A higher staffing ratio was associated with *higher* occurrences of all falls, injury falls, pressure ulcers, and weight loss in the 5-year models (Table 6, models 6a−6e), although most of these associations reversed direction in the yearly models (Table 7, models 7a, 7b, 7d). In these models, an increase in staffing ratio of 1 FTE hour per resident-day represented statistically significant decreases of between 6% and 9% in the risk of all injuries combined, all falls, and unexplained weight loss, when controlling for the effects of year, staffing ratio, and percent Medicaid days (Table 7).

4. Discussion

This study examined the experience of 52,300 nursing home residents through the lens of two types of outcomes: resident/family satisfaction and resident injuries. Our key hypothesis was that the caregivers' work environment is a fundamentally important predictor of the resident experience, as measured both objectively by incidence of falls, pressure ulcers, and weight loss and more subjectively by resident satisfaction surveys. The results supported this hypothesis: employee satisfaction was inversely associated with residents' risk of adverse outcomes. We also found positive associations between employees' overall satisfaction with their work environment and nursing home residents' overall satisfaction with their nursing home experience.

The insight that employee satisfaction with the job may affect resident injuries is an important one, in light of the high rates of adverse resident outcomes in many nursing homes. There is some external evidence that turnover may be one mediator of this relationship [14]. In another sample, high overall job satisfaction was associated with lower intention to leave the job and, ultimately, less turnover among nursing aides in a sample of 72 nursing homes [16]. Separately, high turnover among nursing aides predicted higher odds of pressure ulcers, pain, and urinary tract infections in a nationally representative sample of nursing homes [39]. In other words, turnover has been independently associated with both predictor and outcome; its potential mediation effect should be formally investigated in future research.

Table 6
Mean resident injuries at the center level (2005−09). Poisson regression models with employee satisfaction, clinical staffing ratios, and percentage of resident-days paid by Medicaid

| | All injuries combined Model 6a | | All falls Model 6b | | Falls with injury Model 6c | | Unexplained weight loss Model 6d | | Pressure ulcers Model 6e | |
Variable	Exp (β)	Wald's 95% CI	Exp (β)	Wald's 95% CI	Exp (β)	Wald's 95% CI	Exp (β)	Wald's 95% CI	Exp (β)	Wald's 95% CI
Overall employee satisfaction	0.811†	0.793, 0.830	0.877†	0.854, 0.900	1.167†	1.095, 1.244	0.793†	0.754, 0.834	0.446†	0.413, 0.482
FTE‡ hours/resident-day	1.052†	1.046, 1.057	1.063†	1.057, 1.070	1.190†	1.173, 1.207	1.018*	1.005, 1.031	1.034*	1.014, 1.054
% Medicaid days	0.874†	0.843, 0.906	0.964	0.924, 1.006	0.594†	0.538, 0.656	0.638†	0.589, 0.692	0.799*	0.706, 0.905
Model statistics	X^2 (3, n = 175) = 18407.73 p < 0.0001		X^2 (3, n = 175) = 20089.68 p < 0.0001		X^2 (3, n = 175) = 12400.41 p < 0.0001		X^2 (3, n = 175) = 4973.64 p < 0.0001		X^2 (3, n = 175) = 3750.28 p < 0.0001	

CI, confidence interval.
*　p < 0.01.
†　p < 0.0001.
‡　FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.

Table 7
Mean yearly resident injuries, regressed on employee satisfaction. Multilevel Poisson regressions, with center as second-level variable

Fixed Effects	All injuries combined Model 7a		All falls Model 7b		Falls with injury Model 7c		Unexplained weight loss Model 7d		Pressure ulcers Model 7e	
	Exp (β)	p	Exp (β)	p	Exp (β)	p	Exp (β)	p	Exp (β)	p
Overall employee satisfaction	0.907	<0.0001	0.914	<0.0001	1.055	0.2608	0.884	0.0016	0.858	0.0069
Year	1.003	0.1273	1.000	0.9982	0.976	<0.0001	1.019	<0.0001	0.984	0.0044
FTE† hours/resident-day	0.942	<0.0001	0.943	<0.0001	0.968	0.097	0.909	<0.0001	1.041	0.0594
% Medicaid days	0.812	0.0014	0.736	<0.0001	0.714	0.0600	0.983	0.8958	0.867	0.4445
–2 Res log pseudo-likelihood*	1813.54		1956.69		1959.15		2320.45		1896.29	

* Residual pseudo-likelihood method of estimation, variance matrix blocked by center.
† FTE is full-time equivalent. An FTE of 1.0 indicates one full-time worker for 1 year.

If employee dissatisfaction is indeed a major impetus behind high turnover, and consequently, a significant contributor to diminished quality of care, then nursing homes that aspire to higher standards must make their employees' needs a priority. The question then becomes, what are employees' needs? Put differently, which adjustments to the work environment would most effectively improve employee well-being, and through this, resident outcomes? Part of our analysis attempted to pinpoint those aspects of the work environment most strongly associated with the resident experience, with an eye to informing future interventions. We found that employee satisfaction with "working conditions"—a domain that includes items on attentiveness and care of management, assistance with employee job stress, and staff-to-staff communication, among others—was the domain most strongly associated with resident satisfaction with quality of care (Tables 4 and 5). Another variable in the "working conditions" factor was satisfaction with pay (Table 2). It is reasonable that this loaded on the same domain because a fair wage may also be perceived by employees as a sign of managerial approval and support. However, it may have a less direct role in regard to resident care and thus might have slightly diluted the association reported here.

Taken together, these results suggest that nursing home residents appear to be more satisfied when their caregivers are compensated fairly, supported by their managers, provided with stress assistance, and working in an environment that values communication. At a time when rising health-care costs and stagnant Medicaid reimbursement rates place real constraints on increasing wages [40], a supportive work environment may become even more crucial to employee retention and increased quality of care.

What do "managerial support", "better communication", and "stress assistance" look like in practice? According to Holmberg et al [24], nursing aides reported that lack of time and staff contributed to a rushed and stressful workplace climate. This, in turn, affected quality of care by lengthening resident wait times for care and reducing one-on-one time with each individual resident. At the same time, the failure of the administration to respect the experience and expertise of nursing aides was believed to increase the likelihood that treatment errors could occur as the opinions of the primary caregivers were frequently ignored [24]. In such a situation, "stress assistance" could take the form of implementing policies that ensure adequate, consistent staffing and good communication between the professionals on duty, while "managerial support" might mean cultivating a greater respect for the input of nursing aides, actively soliciting their opinion, and allowing them greater decision-making autonomy in certain aspects of day-to-day resident care. Participatory teams could be created, in which nursing aides, nurses, and doctors jointly decide on procedures for resident care. Participation in teams has been found to be effective both in making employees feel heard and in improving their health, safety, and psychological well-being [41,42].

Possible alternative explanations for the current findings also deserve consideration. Clinical staff hours, and hence staffing ratio, might partly serve as a proxy for complexity of resident clinical condition. In that case, we would expect staffing to have a negative association with resident outcomes. However, the evidence for this was mixed: a higher staffing ratio was associated with a higher incidence of injuries in the 5-year models (Table 6), but the associations reversed direction and became protective in the yearly models (Table 7). In addition, it is possible that resident and staff satisfaction are partly codetermined by the socioeconomic level of the community in which the facility is located. However, we would expect that to be negatively associated with the proportion of resident-days paid by Medicaid. It is perplexing that injury rates were lower in facilities with a higher Medicaid percentage, and this may also argue against confounding by community socioeconomic level.

This work has several merits. It presents quantitative evidence, based on relatively large populations of both staff members and residents, over a 5-year time period, of the under-studied association between a supportive work environment in nursing homes and improved resident outcomes. Employee satisfaction has been examined not only as a whole, but in terms of particular subdomains of satisfaction, yielding the important insight that employee satisfaction with management support, fair pay, stress assistance, and improved communication is especially relevant to resident outcomes. This association has immense potential to improve quality of care, for it suggests that negative resident outcomes that have so far been resistant to change can be tackled with changes to the workplace.

A methodological strength is the fact that the subdomains of employee satisfaction in the MyInnerview survey were reevaluated by factor analysis. The original *a priori* subdomains appear to have been defined solely on face validity, but their correlations with each other did not correspond to those domains empirically. It is not known whether the survey developers conducted any factor analysis, but if so, our results might have differed because the full MyInnerview population is a heterogeneous one including workers at for-profit and nonprofit nursing homes, SNFs, assisted living facilities, and other types of facilities. The current study population was only workers at SNFs owned by a single, for-profit corporation, and this difference in populations might have affected the underlying factor structure.

Another strength is that the surveyed occupations included not only caregivers (nursing assistants and direct care nurses) but also housekeeping, laundry, and maintenance staff [37]. Thus, the survey included job satisfaction data from often-overlooked workers who contribute very materially to the well-being of residents.

One limitation of the survey is that the work environment is measured only through elements of employee satisfaction. Other issues, such as physical strain from job tasks, worker participation in shift scheduling or other decision-making, and the degree to

which employees' knowledge is respected by supervisors, are not measured. Any of these job features might plausibly affect resident outcomes. Therefore, future studies should consider adding data collected with instruments that measure these aspects of the job.

In conclusion, the relationship between the well-being of health-care workers and that of patients or residents has been frequently posited, but still infrequently studied. The present results add to the growing body of evidence that the environment of care is also a work environment and that both nursing home workers and residents would benefit from improvements in that work environment.

Conflicts of interest

All authors have no conflicts of interest to declare.

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