Quality of Care in the Nursing Home: Effects of Staff Assignment and Work Shift

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Purpose: The purpose of this study was to compare a variety of resident and staff outcomes across two types of staffing patterns, permanent and rotating assignment, and work shift. Although studies have examined these staffing patterns as part of multicomponent intervention packages, few studies have examined the isolated effects of staffing pattern by using an experimental design. Design and Methods: A between-groups comparison design was used to compare residents and certified nursing assistants (CNAs) from four nursing homes; two self-identified as using permanent assignment (PA) staffing and two as using rotating assignment (RA) staffing. Measures yielded data on verbal interaction among residents and staff, resident disruptive behavior, and specific aspects of resident–staff behavior during care routines. Other assessments included resident personal appearance and hygiene, expressed affect, and CNAs’ job satisfaction, burnout, absenteeism, and turnover rates. A treatment fidelity check was conducted to confirm PA and RA staffing patterns. Results: Staffing patterns were significantly different between self-identified PA and RA nursing homes. Residents in PA nursing homes and on morning shifts received significantly higher ratings of personal appearance and hygiene. Rates of expressed sadness and interest among residents differed by staffing patterns and shift. However, these differences do not appear to be clinically significant. Although absenteeism was higher in PA nursing homes, these CNAs reported greater job satisfaction than CNAs from RA nursing homes. As expected, evening shifts across nursing homes had significantly higher turnover rates and significantly more resident disruptive behavior. Implications: Quality-of-care outcomes were similar among the two types of nursing homes, despite significantly different staffing patterns. Though staff permanency rates in PA nursing homes (50%) were twice that of RA nursing homes (26%), more research is needed to determine feasibility of higher rates of staff permanency (i.e., > 50%) and effects on resident and CNA outcomes.

Key Words: Nursing assistant, Staffing patterns, Direct observational time sampling

Current estimates indicate that, between the years 1997 and 2020, the nursing home population will increase from 1.8 million to more than 3.0 million (HCIA & Arthur Andersen, 1997). Providing high quality of care for this growing population is critical, and despite improvements in the past decade, concerns about quality of care persist (Wanderlich & Kohler, 2001). Because nursing home residents generally require staff assistance to complete many activities of daily living, the maintenance of good quality of care is highly dependent on the care provided by nursing home staff (Maas, Buckwalter, & Specht, 1996) and, in particular, by certified nursing assistants (CNAs; see Burgio, Engel, Hawkins, McCormick, & Scheve, 1990). Thus, it is the CNA’s job performance that is likely to have the greatest influence on the residents’ quality of care.

One factor that has been shown to affect quality of care is the manner in which duties are assigned to CNAs (Campbell, 1985; Cox, Kaeser, Montgomery, &
The two most common models of job assignment are permanent and rotating assignment (PA and RA, respectively), also referred to in the literature as primary care and team nursing, respectively (Campbell, 1985). PA involves consistently assigning individual CNAs to specific residents with the general goal of enhancing the accountability and continuity of care. In RA, a team of CNAs is assigned to a group of residents, and the team rotates by use of a predetermined schedule (e.g., weekly or monthly). One goal of RA is to distribute the burden of “difficult” and “care intensive” residents across all available CNAs in an attempt to prevent staff burnout.

The small existing literature on staff assignment in nursing homes reports mixed findings, depending on whether staff assignment was one component of a multicomponent intervention or whether it was the primary target of the intervention. The multicomponent studies report primarily positive findings for PA staffing. Teresi and colleagues (1993) compared resident and staff outcomes in intervention nursing homes using PA and a system of enhanced communication to control nursing homes using rotating, or “as usual” assignment. Cox and colleagues (1991) evaluated the effects of an intervention package combining PA, case management, and resident-centered schedules by using a before–after quasi-experimental design. Both of these studies report positive effects for their intervention packages, which ranged from increased feelings of personal control and choice and a decrease in disruptive behavior among residents to a greater sense of self-efficacy among CNAs (i.e., self-reports of higher quality of care provided during PA).

Two studies have examined the effects of type of staff assignment in isolation of other intervention components. Patchner and colleagues (Patchner, 1989; Patchner & Patchner, 1993) compared various resident and staff outcomes under PA and RA schedules by using a before–after quasi-experimental design. This study found that residents who were permanently assigned to CNAs exhibited decreases in behavior problems and increases in health outcomes. Moreover, CNAs reported that they provided the residents with better care and were more aware of the residents’ needs under the PA schedule. CNA absenteeism and turnover rates were also much lower. However, CNAs noted that under PA they became bored with their care routine and that residents often became overly demanding. Unfortunately, all of the assessments of resident quality of care and behavior in this study were based on reports from unblinded supervisory nurses, thus introducing the possibility of response bias into the results.

Campbell (1985) evaluated the effects of PA staffing on several resident and staff variables by using a before–after design. After implementing PA staffing in a long-term-care facility that previously used RA staffing, Campbell found a reduction in decubitus ulcers and increases in functional ability among residents after 1 year. Under PA, staff reported that they felt more accountable for their actions and better able to make decisions for their residents. In addition, turnover rates decreased by 29%.

Using a survey method, Goldman (1998) explored nursing staff perceptions of PA and RA staffing systems. In general, the surveys showed that staff, residents, and families preferred PA staffing. Specifically, residents and their families reported a greater sense of comfort in knowing the primary caregiver and that there was some continuity of care. CNAs reported experiencing a greater sense of responsibility and increased job satisfaction.

In the present study we examined the isolated effects of PA and RA, as well as the isolated and combined effects of work shift, on quality of care by using reliable direct observational methodology. We examined day and evening shifts separately because of differences in staff-to-resident ratios and because staff turnover is generally higher on the evening shift (Helmer, Olson, & Heim, 1993; Waxman, Carner, & Berkenstock, 1984). Specifically, we examined four primary outcome measures that have been identified in the literature as indicators of quality of care by type of assignment and work shift: the quantity and some quality aspects of CNA–resident interaction, resident behavioral disturbances, affect states, and personal appearance and hygiene. We also examined other variables that have been associated with type of staff assignment, including CNA absenteeism, turnover rates, and job satisfaction. Finally, none of the studies in this area have examined whether nursing homes self-identifying as using rotating or permanent staffing actually use these staffing assignment patterns on a day-to-day basis.

Methods

Setting and Participants

We conducted this study in four nursing homes located in Birmingham, AL. The nursing homes ranged in size from a census of 119 to 187, and staffing ratios were very similar (1:7–1:8 on the day shift; 1:10–1:12 on the evening shift). Two of the facilities self-identified as PA and two as RA.

Residents.—We considered residents to be eligible for the study if they (a) were at least 60 years of age, (b) were expected to stay in the facility for at least 9 months, (c) spoke English, and (d) were considered by the medical director to be in stable medical condition. In the RA nursing homes, of 160 possible participants, 55% consented (n = 88), and in the PA nursing homes, 196 were eligible and 53% consented (n = 104), resulting in an overall sample size of 192. Table 1 shows selected characteristics of this sample by type of nursing home. We obtained proxy consent
for residents who were considered by the nursing home interdisciplinary team as being unable to provide their own consent. We obtained assent from these individuals.

Certified Nursing Assistants.—All 7–3 shift (morning shift) and 3–11 shift (evening shift) certified nursing assistants (CNAs) were invited to participate in the study. A total of 87 CNAs participated in the RA nursing homes and 91 CNAs in the PA nursing homes. Table 2 shows selected characteristics of the CNAs by type of nursing home.

Design

We used a between-groups quasi-experimental comparison design to examine differences in resident quality of care by type of staff assignment (rotating or permanent) and work shift.

Procedures

We collected data within each randomly scheduled nursing home on cohorts of eight residents during a 10-day period. A cohort consisted of a group of residents who resided on the same floor or unit and for whom data were collected concurrently. Within this 10-day period, we collected resident data during both the morning and evening shifts by using four direct observational systems and several paper-and-pencil measures. We randomly determined the sequence of cohorts.

Table 1. Resident Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>RA</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% female)</td>
<td>81.82</td>
<td>80.77</td>
</tr>
<tr>
<td>Ethnicity (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>34.09</td>
<td>10.58**</td>
</tr>
<tr>
<td>White</td>
<td>65.91</td>
<td>89.42**</td>
</tr>
<tr>
<td>Age: M (SD)</td>
<td>85.00 (8.60)</td>
<td>85.66 (8.87)</td>
</tr>
<tr>
<td>Length of time residing at nursing home (months): M (SD)</td>
<td>31.42 (34.59)</td>
<td>27.64 (29.68)</td>
</tr>
<tr>
<td>Mini-Mental State Exam: M (SD)</td>
<td>11.68 (8.62)</td>
<td>8.58 (9.14)*</td>
</tr>
<tr>
<td>Barthel Self-Care Rating Scale: M (SD)</td>
<td>2.85 (0.98)</td>
<td>3.03 (0.92)</td>
</tr>
<tr>
<td>Medications prescribed Total: M (SD)</td>
<td>6.59 (3.20)</td>
<td>9.18 (4.70)**</td>
</tr>
<tr>
<td>Psychotropic: M (SD)</td>
<td>0.59 (0.81)</td>
<td>0.90 (1.21)*</td>
</tr>
</tbody>
</table>

Note: RA = rotating assignment (n = 88); PA = permanent assignment (n = 104).
*p < .05; **p < .01.

Table 2. CNA Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>RA</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% female)</td>
<td>96.55</td>
<td>93.48</td>
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<tr>
<td>Ethnicity (%)</td>
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<td>African American</td>
<td>90.80</td>
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<td>White</td>
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<tr>
<td>Hispanic–Latino</td>
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<td>1.09</td>
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<tr>
<td>Asian American</td>
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<td>1.09</td>
</tr>
<tr>
<td>Highest level of education (%)</td>
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<td></td>
</tr>
<tr>
<td>Attended high school or less</td>
<td>10.35</td>
<td>8.79</td>
</tr>
<tr>
<td>Completed high school</td>
<td>32.18</td>
<td>32.97</td>
</tr>
<tr>
<td>Attended some college</td>
<td>57.48</td>
<td>58.23</td>
</tr>
<tr>
<td>Age: M (SD)</td>
<td>38.77 (13.43)</td>
<td>37.05 (10.46)</td>
</tr>
<tr>
<td>Length of time working at nursing home (months): M (SD)</td>
<td>66.63 (88.63)</td>
<td>62.59 (66.07)</td>
</tr>
<tr>
<td>Length of time providing care to elderly individuals (months): M (SD)</td>
<td>129.98 (118.77)</td>
<td>118.54 (88.16)</td>
</tr>
<tr>
<td>Hours worked per week</td>
<td>35.36 (7.94)</td>
<td>37.52 (2.94)*</td>
</tr>
</tbody>
</table>

Note: RA = rotating assignment (n = 87); PA = permanent assignment (n = 91); CNA = certified nursing assistant.
*p < .05.

Direct Observational Systems: CABOS.—The computer-assisted behavior observational systems, or CABOS, allowed researchers to assign keys on a laptop computer to various behavioral and environmental events, which were used to record either the frequency or duration of a target event, or both. There were two separate CABOS used in this study.

We used the first system, termed the activity time-sampling system, to sample behaviors and events throughout the morning and evening shifts. For purposes of this study, the events of interest (target events) were (a) overall number of statements made from residents to CNAs, (b) percentage of time residents and CNAs spent in verbal interaction, and (c) percentage of time residents exhibited disruptive behavior (i.e., disruptive vocalizations including screaming, cursing, and repetitive vocalization; physical restlessness; physical aggression). We observed each resident within a cohort six times in 30-min time blocks (3 hr total) that were randomly distributed across morning and evening shifts (three each during morning and evening shifts) throughout the 10-day data-collection period. We assessed interrater reliability with 11% of these activity time-sampling sessions. Interrater reliability was calculated by comparing the two raters’ computer observational files on a second-by-second basis using Cohen’s kappa. The mean Cohen’s kappa for the three target events was .81 (resident to CNA verbal statements), .81 (overall verbal interaction between residents and CNAs), and .65 (resident disruptive behavior).
The second CABOS, the daily care system, focused on staff–resident interactions and behaviors during daily care activities such as toileting, dressing, bathing, and grooming. We observed only those care sessions that involved a minimum of four care tasks. Target events included (a) percentage of time residents and CNAs were engaged in resident-initiated nonnegative verbal interaction (i.e., requests for assistance, neutral response to CNA question, and statement of appreciation directed to CNA), (b) percentage of time residents and CNAs were engaged in CNA-initiated, task-related positive verbal interaction (i.e., CNA verbal prompting, announcing a care activity, asking the resident a question, greeting the resident, and giving the resident a statement of appreciation), and (c) the percentage of time residents engaged in disruptive behavior. We observed each resident once during a morning care activity and once during an evening care activity. We assessed interrater reliability for 13% of these observations, and the mean Cohen’s kappa for the three target events was .70 (resident-initiated nonnegative verbal interaction), .82 (CNA-initiated, task-related positive verbal interaction), and .60 (resident disruptive behavior).

**Paper-and-Pencil Measures: PAI.**—The Personal Appearance and Hygiene Index, or PAI (McClannah, McGee, MacDuff, & Krantz, 1990), a 21-item observational checklist of quality of care, was originally developed for use with community-dwelling and institutionalized autistic children to evaluate cleanliness, clothing adequacy, and personal care. We adapted this measure for application with nursing home residents by dropping two of the original items (“no rubber pant or diaper” and “nose clean”) and adding three items (“shoes on,” “socks on,” and “dressed in clothing”). We obtained a total score by summing the number of items for which the operational definition of quality of care were met and dividing that number by the total number of applicable items. We assessed interrater reliability during 14% of the sessions, and the percentage agreement was 92%.

The PAI was completed six times for each resident during the 10-day period. Each assessment was completed at least ½ hr, but no later than 1½ hr, after a meal. We assessed each resident twice following breakfast, lunch, and dinner. Because we were interested in measuring standard PA and RA nursing homes, the PAI was not completed when the resident was being cared for by a CNA who was not regularly assigned to the nursing unit (i.e., agency CNA or a CNA who was pulled from another floor). The schedule for administering the PAI was generated through a random process, and CNAs did not know when observations would take place.

**Affect Rating Scale.**—We used an adapted version of the Affect Rating Scale, or ARS (Lawton, Kleban, Dean, Rajagopal, & Parmelee, 1992) to assess six different resident affect states: pleasure, anger, anxiety–fear, depression–sadness, interest, and contentment. The original measure allowed for each affect state to be rated on a 6-point scale specifying the approximate amount of time it occurred during a 10-min observation period. Maintaining the original 10-min observation period, we transformed the original measure into a partial-interval time-sampling system and also added the category “sleep.” In our modification, the occurrence or nonoccurrence of a resident’s six affect states and sleep was observed during twenty 30-s intervals (10-min total observation period). The measure yielded a percentage of total intervals during which each affect state was observed. We observed residents with the ARS a total of eight times throughout the data-collection period (four times each during the morning and evening shifts).

**Mini-Mental State Examination.**—The Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975) is a brief cognitive screening tool frequently used to provide an overall indication of older adults’ cognitive ability. It has been shown to reliably discriminate patients with and without cognitive impairment, and test–retest and interrater reliability have also been demonstrated consistently ($r = .89$ and $r = .83$, respectively).

**Barthel Self-Care Rating Scale.**—The Barthel (Sherwood, Morris, Mor, & Gurkin, 1977) assesses residents’ ability to complete self-care tasks. Specifically, nursing staff rate residents’ ability to appropriately complete such tasks as feeding, dressing, grooming, bathing, walking, and toileting. Each item is rated on a 4-point Likert scale, with higher scores signifying greater dependence. Sherwood and colleagues reported high internal consistency for this measure, with Cronbach’s alpha coefficients ranging from 0.95 to 0.97.

**Resident Medical Diagnosis–Demographic Form.**—We obtained relevant diagnostic and demographic information from the resident’s medical record.

**Medication Tracking Form.**—We use this form extensively in prior research to gather specific information on residents’ medications (Allen et al., 2003; Burgio et al., 2001; Fisher et al., 2002). This form allows for recording the strength and dosage of each medication, the number of times the medication was actually administered, and the length of time the resident has been taking the medication.

**Job Satisfaction Index.**—The Job Satisfaction Index (JSI) was developed to assess the attitudes of nursing home employees regarding their work roles.
Maslach Burnout Inventory.—The Maslach Burnout Inventory (MBI; Maslach & Jackson, 1984) is a 22-item scale developed to measure job burnout in human service workers. Burnout has been characterized as including emotional exhaustion, depersonalization, and reduced personal accomplishment. The MBI has demonstrated high internal consistency ($r = .83$) and good test–retest reliability ($r = .60–.82$); convergent validity has also been demonstrated (Maslach & Jackson, 1984). In this study, the rater scored each statement on a 7-point Likert scale (never to every day) representing how frequently the particular sentiment was experienced. The summary score is a mean per item score.

CNA Turnover and Absenteeism.—We calculated turnover as the proportion of CNAs who ceased employment for any reason during the data-collection period divided by the number of total CNAs working at a facility during the same time period. We collected CNA absenteeism data in each facility during the same period of time. We calculated CNA absenteeism as the proportion of CNAs who did not report to work for any reason on their scheduled workday, over the total number of CNAs scheduled to work.

Staffing Assignment Fidelity Check.—One month prior to beginning data collection for each nursing home, we computed the degree of permanency of staff assignment for the facility to verify that the staffing patterns between self-identified PA and RA nursing homes were different. We measured this degree of permanency by calculating the percentage of time all residents in the facility were cared for by their most frequently assigned CNA. Specifically, researchers recorded which CNAs were assigned to each resident on a daily basis. We generated a measure of permanency for each resident by totaling the number of days the most frequently assigned CNA had worked with the resident and dividing it by the total number of workdays in the assessed month ($n = 20$), with the assumption that residents under a PA schedule would be cared for by one particular CNA (i.e., their assigned primary CNA) more often than residents under an RA schedule. We then averaged these percentages across all residents to yield a facility-wide measure of the degree of permanency of staff assignment in the nursing home.

Data Analysis

We analyzed data expressed in rates or total scores across type of nursing home (PA and RA) by using repeated measures analyses of variance. When we analyzed these data across shifts, we used standard analyses of variance. We analyzed CNA absenteeism and turnover by using chi-square tests for dichotomous outcomes. We examined assumptions for these procedures and we considered transformations of variables.

Results

Descriptive Data

Residents.—As shown in Table 1, there were no gender or age differences between residents in the PA and RA nursing homes. Both types of nursing homes had a majority of females, 80.8% for PA and 81.8% for RA, and the average age was 85.7 for PA nursing homes and 85.0 years for RA nursing homes. However, we did find significant differences between PA and RA nursing homes on ethnicity, total number of medications prescribed, number of psychotropic medications prescribed, and MMSE scores. PA nursing homes had a significantly higher percentage of Caucasian or White residents (89.4%) and a lower percentage of African American or Black residents (10.6%) than did RA nursing homes (Caucasian or White = 65.9%; African American or Black = 34.1%), $\chi^2 = 15.69\ (df = 1), p < .0001$. Residents in the RA nursing homes had significantly higher MMSE scores ($X = 11.7 \pm 8.6$) compared with residents in the PA nursing homes ($X = 8.6 \pm 9.1$), $F(1, 188) = 5.69, p = .018$. PA residents were prescribed more medications overall than RA residents, $F(1, 190) = 19.21, p < .0001$, and they were also prescribed more psychotropic medications than RA residents, $F(1, 190) = 4.26, p = .04$. To adjust for these differences between PA and RA nursing home residents, we included MMSE scores and the total number of psychotropic medications prescribed as covariates in all resident-based analyses.

CNAs.—We found no significant differences between nursing home type for number of CNAs assigned to morning and evening shifts, gender, ethnicity, education, age, time working in the nursing home, or length of time aiding elders (see Table 2). We examined differences in hours worked per week by using a $t$ test for a simple comparison between CNAs in RA and PA nursing homes. CNAs in RA nursing homes worked approximately 2 hr/week.
less than those in PA nursing homes (35.4 hr/week vs. 37.5 hr/week; $t = 2.38, p = .018$). We decided that the difference between groups on this variable, though statistically significant, was not sufficient to affect staff outcomes. Thus, we did not adjust the groups on this variable in the analyses.

**Staff Assignment Fidelity Check**

Prior research suggests that turnover is significantly higher for evening shifts (Helmer et al., 1993; Waxman et al., 1984); thus, we analyzed these data independently by shift. Results showed that staffing permanency was significantly different between PA and RA nursing homes across both morning and evening shifts, $F = 594.30, p < .0001$ and $F = 185.76, p < .0001$, respectively. Residents in PA nursing homes received care from their most frequently assigned CNA 48% of the time on morning shifts and 51% of the time on evening shifts. Residents in RA nursing homes received care from their most frequently assigned CNA 22% of the time on morning shifts and 29% of the time on evening shifts.

**Effects of Staff Assignment: Resident Outcomes**

**Direct Observational Systems.**—We found no significant effects for staff assignment on any of the resident–CNA verbal interaction variables or resident disruptive behavior.

**PAI and ARS.**—We found a significant main effect for staff assignment on ratings of personal appearance and hygiene. Residents in PA nursing homes received significantly higher ratings (morning shift = 87.4 ± 7.9; evening shift = 86.8 ± 7.4) than residents in RA nursing homes (morning shift = 87.1 ± 7.1; evening shift = 84.8 ± 7.7), $F(1, 186) = 3.94, p = .048$. There were no main effects for staff assignment in the amount of time that residents expressed any of the affect states measured by the ARS. However, we did find a significant Staff assignment × Shift interaction for expressed sadness, $F(1, 185) = 6.31, p = .0129$ (Figure 1), and for expressed interest, $F(1, 185) = 8.19, p = .0047$ (Figure 2). Though underpowered to compute a variety of multiple comparisons that could be suggested by these interactions, we did find that, descriptively, it appears that resident expressions of sadness and interest occurred at different rates from the morning to the evening shift, depending on type of staff assignment. Specifically, residents in PA nursing homes expressed sadness more often on the evening shift than on the morning shift (morning shift = 7.3% ± 19.7%; evening shift = 10.5% ± 23.6%), whereas residents in RA nursing homes showed the opposite pattern, with sadness expressed more often on the morning shift than on the evening shift (morning shift = 7.9% ± 20.1%; evening shift = 5.3% ± 15.7%). For expressed interest, residents in PA nursing homes expressed interest less often on the evening shift than on the morning shift (morning shift = 97.4% ± 10.0%; evening shift = 89.2% ± 25.3%), and, though differences appear minimal, residents in RA nursing homes expressed interest less often on the morning shift than on the evening shift (morning shift = 94.2% ± 17.1%; evening shift = 94.5% ± 14.7%).

**Effects of Staff Assignment: CNA Outcomes**

**Job Satisfaction and Burnout.**—We found a significant main effect for staff assignment on job satisfaction, $F(1, 173) = 6.38, p = .0124$. CNAs working in PA nursing homes scored higher on our measure of job satisfaction (morning shift, $X = 3.5 ±$
However, we did find a significant main effect for staff assignment in turnover rates. There was no significant effect for staff assignment on burnout.

**Turnover and Absenteeism.**—We found no significant effects for staff assignment in turnover rates. However, we did find a significant main effect for staff assignment in absenteeism, $\chi^2 = 25.32, df = 1, p < .0001$. CNAs working in RA nursing homes called off from work significantly more often (7.5% of the time) than CNAs working in PA nursing homes (5.2% of the time).

<table>
<thead>
<tr>
<th>Nursing Home Codes</th>
<th>RA M (SD)</th>
<th>PA M (SD)</th>
<th>Univariate F(1, 186)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident–CNA verbal statements (occurrence per 5-min interval)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.m. shift</td>
<td>0.50 (0.90)</td>
<td>0.46 (1.03)</td>
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</tr>
<tr>
<td>p.m. shift</td>
<td>0.79 (1.34)</td>
<td>0.67 (1.08)</td>
<td></td>
</tr>
<tr>
<td>CNA–resident interaction (% occurrence overall)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.m. shift</td>
<td>2.57 (4.77)</td>
<td>2.70 (5.70)</td>
<td></td>
</tr>
<tr>
<td>p.m. shift</td>
<td>2.66 (4.03)</td>
<td>3.17 (4.74)</td>
<td></td>
</tr>
<tr>
<td>Resident disruptive behavior (% occurrence overall)</td>
<td></td>
<td></td>
<td>10.83*</td>
</tr>
<tr>
<td>a.m. shift</td>
<td>4.50 (11.06)</td>
<td>3.87 (10.28)</td>
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</tr>
<tr>
<td>p.m. shift</td>
<td>7.38 (17.36)</td>
<td>7.06 (14.59)</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* RA = rotating assignment; PA = permanent assignment; CNA = certified nursing assistant.

*0.5; evening shift, $X = 3.6 \pm 0.6$) than CNAs working in RA nursing homes (morning shift, $X = 3.3 \pm 0.6$; evening shift, $X = 3.4 \pm 0.6$). There was no significant effect for staff assignment on burnout.

**Effects of Shift: Resident Outcomes**

**Direct Observational Systems.**—In the activity time-sampling system, there were no main effects for shift on resident–CNA verbal interaction. However, there was a main effect for shift for resident disruptive behavior, $F(1, 186) = 10.83, p = .0012$ (Table 3). Disruptive behavior occurred at a significantly higher rate during the evening shift (PA = 7.1% ± 14.6%; RA = 7.4% ± 17.4%) than during the morning shift (PA = 3.9% ± 10.3%; RA = 4.5% ± 11.1%). During daily care, we found a main effect for shift in the amount of time residents engaged CNAs in a non-negative verbal interaction, $F(1, 183) = 4.37, p = .0381$ (Table 4). Although daily care sessions were significantly shorter in the evening ($M = 10.52$ min) than in the morning ($M = 17.88$ min), $F = 50.06, p < .0001$, resident-initiated nonnegative verbal interac-
tion occurred at a higher rate on the evening shift (PA = 0.8% ± 0.9%; RA = 1.0% ± 1.1%) than on the morning shift (PA = 0.6% ± 0.7%; RA = 0.7% ± 0.7%).

**PAI and ARS.**—We found a significant main effect for shift on PAI ratings, $F(1, 186) = 5.70, p = .0180$. Residents received significantly higher ratings on personal appearance and hygiene during the morning shift (PA = 87.4 ± 7.9; RA = 87.1 ± 7.1) than during the evening shift (PA = 86.8 ± 7.4; RA = 84.8 ± 7.7).

Regarding affect states, there was a significant main effect for shift in amount of interest expressed by residents, $F(1, 186) = 15.71, p < .0001$. Residents expressed interest significantly more often during the morning shift (PA = 97.4% ± 10.0%; RA = 94.2% ± 17.1%) than during the evening shift (PA = 89.2% ± 25.3%; RA = 94.5% ± 14.7%). There were no main effects for shift on any of the other affect states.

**Effects of Shift: CNA Outcomes**

**Job Satisfaction and Burnout.**—There was no significant main effect for shift on job satisfaction. However, we did find a significant main effect for shift on amount of burnout reported, $F(1, 173) = 5.67, p = .0183$. CNAs on the morning shift reported higher burnout (PA, $X = 4.1 \pm 0.8$; RA, $X = 4.1 \pm 0.7$) than CNAs on the evening shift (PA, $X = 3.7 \pm 0.8$; RA, $X = 3.9 \pm 0.7$).
Turnover and Absenteeism.—We found a significant main effect for shift for turnover rates, $\chi^2 = 9.435$, $p = .0022$, and for absenteeism, $\chi^2 = 9.40$, $p = .0022$. We found significantly higher turnover rates on the evening shift (9.8%) than on the morning shift (4.9%). Absenteeism was significantly more likely on the morning shift (4.0% of the time) than on the evening shift (2.2% of the time).

Discussion

Results show that the nursing homes in this study that self-identified as using PA staffing assigned a primary CNA to an individual resident at approximately twice the rate of nursing homes self-identifying as using RA (approximately 50% vs. 26%). Having established that these two forms of staffing assignment reflected a true difference in staffing patterns, we found that neither PA nor RA showed clear superiority in the quality-of-care measures. A direct observational measure of hygiene and grooming (the PAI) did show that scores were significantly higher in PA nursing homes than in RA nursing homes; however, an examination of the mean differences does not suggest a clinically significant difference.

Although we treated it as a covariate in this study, it is possible that the greater number of overall medication prescriptions and greater number of psychotropic prescriptions is an outcome of PA staffing. If so, this may indicate that greater exposure to the same resident results in better knowledge of and attention to changes in resident conditions, translating into greater attention to medication management. This can be particularly important for more cognitively impaired residents. For example, studies show that residents with greater cognitive impairment receive significantly fewer analgesic medications, even though there is no reason to believe that these individuals experience less pain (Bernabei et al., 1994; Evans, 1987; Taylor, Friedman, Sheikh, & Yesavage, 1997). Results also indicate a significant Staff assignment × Shift interaction, with PA residents showing more sadness and less interest during the evening shift and RA residents displaying more sadness during the morning shift. It is possible that PA residents are more likely to form a bond with their primary day shift CNA: the staff member with whom residents spend most of their waking day (7 a.m.–3 p.m.). This “depressed affect” might be a reaction to the absence of this most familiar CNA. Although the remainder of residents’ waking day is also spent with a primary (evening shift) CNA, there are fewer hours during which CNAs and residents can interact before bedtime.

CNAs report higher job satisfaction in PA nursing homes. However, there were no differences for type of staff assignment in either turnover or reports of burnout. One possible explanation for these results is that the JSI and MBI measure qualitatively different aspects of CNAs’ work experience. Specifically, questions from the JSI inquire primarily about external characteristics of the work environment and behaviors of coworkers and administrative staff (e.g., compensation, friendliness of coworkers, cleanliness of environment, and amount of support or training received from administration), in contrast to the questions from the MBI that inquire about CNAs’ internal or emotional responses to and perceptions of various aspects of their work (e.g., feeling emotionally drained from work, feeling frustrated and fatigued, and perceptions of stress from working directly with people on a consistent basis). Thus, it may be that CNAs in PA nursing homes are more satisfied with the external characteristics of their work environment but that these perceptions do not necessarily translate to significantly different emotional responses (burnout) to the work itself.

Higher job satisfaction was not associated in this study with more consistent work attendance, as CNAs working under PA staffing had significantly higher rates of absenteeism than CNAs working under RA staffing. One reason for this finding might be that PA CNAs were scheduled to work more hours per week than RA CNAs. However, the mean difference between the two types of nursing homes was only 2 hr. The clinical significance of this difference is questionable. More research is needed to determine the relationship between type of staff assignment, scheduling practices, and absenteeism.

Regardless of type of staff assignment, differences in quality-of-care indicators emerged for morning and evening shifts. Grooming and hygiene were significantly worse in the evening, although again, it is questionable whether this difference is clinically significant. In this study, staff-to-resident ratios were, on average, 1:8 and 1:12 for the morning and evening shifts, respectively. This difference in available staff per resident may account for poorer personal appearance and hygiene because CNAs have less time available for grooming and hygienic activities with individual residents. Indeed, our data indicate that daily care routines in the evening were significantly shorter than similar routines in the morning (10.52 min vs. 17.88 min, respectively).

Consistent with the sundowning hypothesis of disruptive behavior—that dementia-related agitation appears to increase over the course of a day (Bliwise, 1994; Evans, 1987; Taylor, Friedman, Sheikh, & Yesavage, 1997)—residents in this study exhibited disruptive behavior more frequently on the evening shift. Residents also expressed less interest on the ARS on the evening shift. Broadly, the ARS definition of “interest” (e.g., facial, motoric, or verbal feedback to others; maintenance of eye contact; and turn body or move toward person or object) appears to represent residents’ general, active engagement with their environment. Reduction in interest during the evening shift can be related to
fewer available activities or resident fatigue during the late afternoon and evening hours.

Interestingly, residents on the evening shift initiated more nonnegative verbal interactions with CNAs. This behavioral category includes neutral statements, greetings, compliments, expressions of gratitude, and requests for assistance. Considering that care routines were significantly shorter in the evening, the higher rate of resident-initiated nonnegative interaction may indicate more frequent requests for assistance. It is also possible that residents may have initiated more positive statements (greetings, compliments, and expressions of gratitude) in an attempt to engage the staff during a period of reduced social interaction.

Although there was significantly less staff turnover on the morning shift, absenteeism and reports of burnout were more common. Greater absenteeism and burnout may be related to the more intensive care routines completed on the morning shift, such as bathing and dressing, and competing CNA family obligations (e.g., calling off work to care for sick school-age children). It is unknown why turnover is not also related to absenteeism and burnout. Nevertheless, staff on morning and evening shifts did not report differential job satisfaction.

Conclusions

Our results show work-shift differences in resident behaviors (more disruptive behavior and less interest observed on the evening shift) and CNA behaviors (more burnout and absenteeism in the morning, and more turnover in the evening). Surprisingly, RA and PA resulted in few differences in quality-of-care outcome indicators, precluding a clear conclusion about which type of staffing assignment should be recommended to nursing home management.

However, it is important to note that this is the first study that attempted to measure the degree of permanency of nursing homes that self-identified as permanent and rotating staff assignment. The data show a twofold difference in the percentage of days that residents in PA nursing homes are assigned to their primary CNA (50% vs. 26%). Still, the data show that even in PA nursing homes, residents are matched with their primary CNA during only half of the time. This study was not designed to detect the barriers to more frequent resident–primary CNA matches; nevertheless, it is possible that differences in quality of care might have emerged if higher percentages of permanency were attained. It is also possible that more intensive measurement of the various factors that constitute staff permanency and to outcomes of staff permanency would have resulted in differences in quality of care. For example, future researchers may wish to include direct observation of all resident–staff interaction throughout shifts (rather than randomly time-sampled during shifts, as in this study) and expand on our definitions of resident–CNA interaction to include possibly important nonverbal components of social interaction such as close physical presence, eye contact, and non-task-related comforting touch. Also, the relationship between staffing patterns and medication prescription requires further examination. If these factors are found to be clearly related, this finding could have important implications for resident quality of care and quality of life under permanent and rotating staff assignment.

References


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