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# WORK ORGANIZATION, ECONOMIC INEQUALITY, AND DEPRESSION AMONG NURSING ASSISTANTS: A MULTILEVEL MODELING APPROACH[1,2]

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*Summary.*—To investigate the relationships among the nursing home work environment, emotional strain, and depression in Nursing Assistants in Ohio and West Virginia, this cross-sectional study was conducted with 395 Nurse Assistants in 49 nursing homes in Ohio and West Virginia. Organizational attributes were measured independently at the individual and organizational levels. Multilevel modeling techniques were used to analyze the data. Our methods examined nursing home organizational structure (ownership type, managerial style), and work organization (emotional strain) was examined in relation to the prevalence of depression among nursing assistants. Our findings suggest workplace emotional strain and age are associated with increased odds of depression. Implications of our work include that work in nursing homes for the environment it fosters has a strong effect on emotional strain and depression among Nursing Assistants.

The nursing home industry is among the largest health care provider industries in the United States due to the aging of the population (Wunderlich, Sloan, & Davis, 1996). Furthermore, nursing home work ranks as one of the most hazardous industries in the USA. For example, these approximately 700,000 nursing home workers have the highest rate of overextension injuries (Bureau of Labor Statistics, 2002). While the physical hazards of

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nursing home work are well established (cf. Myers, Silverstein, & Nelson, 2002), there has been little research on the mental health of direct care nursing home workers (Wunderlich, *et al.*, 1996).

In addition to job demands and hazards, nursing assistants also have many emotional demands. These demands include attachment to ailing people, and the difficulties encountered with those who are extremely ill or near death who may have dementia (Novak & Chappell, 1994), having to provide emotional support to elderly people who may have mental disorders, and inability to provide emotional support to people because work loads are high (Foner, 1994). Nursing assistants also tend to have poor working conditions and low socioeconomic status, characteristics that also influence depression and other mental illnesses (Meich, Caspi, Moffitt, Wright, & Silva, 1999; Turner & Lloyd, 1999; Bartley & Marmot, 2000). Low occupational prestige has also been linked to depression (Link, Lennon, & Dohrenwend, 1993). Often, nursing home residents' physical and mental health depends upon the mental health of their Nursing Assistants (Hollinger-Samson & Pearson, 2000). Approximately 1.6 million elderly and disabled Americans reside in nursing homes (Harrington, Woolhandler, Mullan, Carrillo, & Himmelstein, 2001); many are cognitively impaired and lack social support outside the nursing home.

Psychiatric symptoms figure prominently among the hazards of work organization (Kohn & Schooler, 1973; Karasek, 1979; Eaton, Muntaner, Bovasso, & Smith, 2001). Mental disorders in the workplace and depression in particular have important consequences for quality of life, the costs and utilization of health care, and productivity (Sauter, Murphy, & Hurrell, 1990; Keita & Sauter, 1992). Several investigations have found a relationship between work organization and depression (Karasek, 1979; Muntaner, Eaton, Sorlie, Diala, & Kessler, 1998; Stansfeld, Head, & Marmot, 1998; Mausner-Dorsch & Eaton, 2000). Taken as a whole, these investigations on work organization and depression comprise the body of analytical gerontology that supports the development of preventive interventions (Sauter, *et al.*, 1990).

In spite of the size of the Nursing Assistant work force (Harrington, *et al.*, 2001), there have been no studies examining the association between work organization and depression in nursing homes. There is limited evidence suggesting work organization might have an important effect on Nursing Assistants' depression. For example, "stress" has been empirically linked to features of work organization among Nursing Assistants (Dunn, Rout, Carson, & Ritter, 1994; Novack & Chappell, 1994; Cohen-Mansfield, 1995). Other studies have found associations between work organization in long-term care facilities (i.e., interpersonal stressors, high work load, and lack of autonomy) and general mental health, alcohol use, and smoking (Landsbergis, 1988; Dunn, *et al.*, 1994; Schaefer & Moos, 1996).

In addition to work organization, structural organizational characteristics, e.g., ownership type, worker-management relations (Freeman & Rogers, 1999; Harrington, 2001; Harrington, *et al.*, 2001), are likely to affect Nursing Assistants' health. For example, the shift towards managed care with its emphasis on cost containment has been associated with an increased work load among nursing home employees (Buerhaus & Staiger, 1996). Thus, evidence for the effects of work organization on nursing home workers' mental health may support the need for adjustment of workplace safety and health standards (e.g., adequate work loads), greater autonomy, or other changes in the organization of work to ensure both employees' and residents' well being. Before these adjustments can be suggested, research needs to examine work organization's effects on depression among Nursing Assistants in a hierarchical research design to examine structural influences on depression.

Initiatives on the prevention of mental disorders have emphasized the importance of addressing work organization factors (Sauter, *et al.*, 1990; Keita & Sauter, 1992; Quick, Tetrick, & Levi, 2002). One may argue that nursing assistants working in nursing homes, given their hazardous work organization and lower occupational prestige, should be approached as a vulnerable population in need of occupational mental health prevention and health promotion interventions.

Previous studies on the mental health effects of work organization in health care (e.g., Landsbergis, 1988) gathered individual level data via self-report, typically among nurses. Expanding this body of work, organizational level characteristics (e.g., ownership type, managerial pressure) and depression among nursing assistants were examined. Organizational level characteristics are important even when individual-level indicators of work organization are included in the model, providing evidence of a "genuine" organizational correlate of worker health (e.g., Söderfeldt, Söderfeldt, Jones, O'Campo, Muntaner, Ohlson, & Warg, 1997; Elovainio, Kivimaki, Steen, & Kalliomaki-Levanto, 2000; Yperen & Snijders, 2000).

The present study is aimed at testing the hypothesis that organizational characteristics, race, and emotional stress are associated with the prevalence of depression among a single union's Nursing Assistants working in nursing homes in West Virginia and Ohio, and specifically, that emotional demands and lack of autonomy over caring activities are associated with depression among Nursing Assistants. Indicators of emotional demands and autonomy were measured at the individual level and organizational characteristics (e.g., worker-management relations) were measured at the nursing home level. Emotional labor is defined as the emotional strain of the job such as stress, emotional demands of the job, and depression. Emotional strain is defined as emotional demands and control/autonomy.

## Method

This study incorporates several advanced methodological techniques, which are applied to a sample of Nursing Assistants in a new manner. These include a new measure for the screening of depression, the application of an appropriate statistical model for the study of work organization, and the assessment of work organization at the organizational level. These innovations can inform future work organization and occupational mental health studies. We used the revised CES–Depression scale (Eaton, *et al.*, 2001; Eaton, Ybarra, Smith, Muntaner, & Tien, 2004) to assess major depressive disorder. This assessment was based on the DSM-III–R and provided a screening tool for depression with high content validity and attempts to mirror better the diagnostic criteria for depression found in the DSM-III–R [for further background on this measure see Eaton, *et al.* (2004)]. This assessment tool has more specificity than previous versions and helps separate "traits" from clinical states in workplace mental health assessment. Thus, an added benefit of the measure is that making the depression risk more similar to the clinical diagnosis avoids workplace assessments in which normal behavior and pathology are blurred.

### *Sample and Setting*

A cross-sectional design was used, and data were collected from 395 unionized nursing assistants working in 48 nursing homes in West Virginia and Ohio represented by a single union in the fall of 2000. Respondents were interviewed using a 25-min. questionnaire covering work organization, mental health status, and sociodemographic information. Nursing Assistants were eligible for inclusion in the sample if they were members of the union, employed as Nursing Assistants, and had an accurate telephone number; 723 people fit these criteria. Of the 723 eligible participants, 139 (19%) people were called at least 10 times, but an interview could not be completed, although the telephone number was accurate. Interviewers were unable to make telephone contact with 89 (12%) persons; despite 10 attempted calls contact was never made with anyone, the telephone kept ringing or an answering machine picked up, but there was never an actual person to confirm the accuracy or inaccuracy of the number. From our eligible participants 387 completed a questionnaire and 108 refused. To determine whether those who refused to participate differed from those who ultimately agreed to do the interview, all of the 108 refusals were recontacted to ask if they would provide some basic demographic information. Nineteen agreed to answer the demographic questions. Of the remaining 89 'refusals', 44 refused to participate in the refusal sample, 26 no longer had working telephone numbers or had moved away, 18 could not be reached, and 1 person stated that she was not a Certified Nursing Assistant. Our final response rate was 58%. Refusals

were more likely to have been injured on the job. Part of the lower than expected response rate may be attributed to the often transitory work by Nursing Assistants. For example, in the state of Iowa approximately 80% of Certified Nursing Assistants who enter the field leave within one year (Iowa Caregivers Association, 2000). Other reports show similarly high turnover rates with 30 states specifically targeting retention (Government Accounting Office, 2001).

*Measures*

Depression was measured using a 35-item version of the Revised Center for Epidemiologic Studies–Depression (Eaton, *et al.*, 2004). Two levels of depression were scored, depressive symptoms and depressive disorder. Depressive symptoms were classified dichotomously using the original 20 items of the original CES–Depression with a standard cutoff score of 16 (Radloff, 1977). As the original version of the CES–Depression did not capture the aspects of psychomotor retardation/agitation, suicidal ideation within the domain of depression and represented depression using symptoms that are not aspects of the current DSM criteria, the 35-item revision was used to define a depressive disorder dichotomously. The purpose for dichotomizing depressive disorder was to enable the authors to interpret depressive disorder in clinical terms. This involved classifying symptoms into subscales and matching the subscale scores with the criterion for depressive disorder in the DSM-IV (American Psychiatric Association, 1994) (details available upon request). The alpha reliability of the revised CES–Depression ranges from .98 in a pilot study to .93 in a random telephone survey of rural residents of West Virginia (Eaton, *et al.*, 2004).

Two subscales of the Symptom Checklist-90 (Derogatis, Rickels, & Rock, 1976) were used to generate anxiety and somatization scores. These asked for a rating of distress in the past week on a 5-point Likert scale (anchors: 1: not at all and 5: extremely) for a variety of somatic perceptions (headaches, faintness or dizziness, soreness of your muscles, a lump in your throat, etc.), and anxiety symptoms (trembling, feeling fearful, heart pounding or racing, etc.). Items were summed and empirically dichotomized so that the lower two-thirds of scores for each subscale represented the reference group. Among the second wave, the proportion of respondents presenting scores above the traditional 16+ cut-off score indicating risk of depression was very close for the revised scale and for the original CES–Depression (60.7% vs 59.7%). The cut-off has been replicated in the current study from the scale used by Eaton, *et al.* (2004).

Emotional demands were assessed using a 6-item scale (Söderfeldt, *et al.*, 1997; Ohlson, Söderfeldt, Söderfeldt, Jones, & Theorell, 2001). These items are designed to capture the workplace emotional demands experienced

while providing direct care to people, e.g., not enough time to provide emotional support to clients. Also assessed were demographic, psychosocial, behavioral, health, and labor market-related potential confounders. These included age of respondent (continuous), sex of respondent (male, female), race/ethnicity (white, black, Hispanic, Native American, and other), health insurance (availability as well as type), and length of employment at that nursing home (number of months). Controls for number of hours of housework and marital status were included to measure potential for social support and an outside stressor (Dakoff & Taylor, 1990; Beach, Fincham, Katz, & Bradbury, 1996). Further measures of social support and stressors were not asked about, as they were not central issues to the original research questions. A question identified the type of unit, i.e., subacute, Medicare/skilled nursing, standard/basic nursing, Alzheimer, rehabilitation, other, where the Nursing Assistants worked.

Pre-existing psychopathology was assessed using a question on past history of depression: "Have you ever had two weeks or more when nearly every day you felt sad, blue, depressed?" This question was adapted from the National Comorbidity Survey (Kessler, McGonagle, Zhao, Nelson, Hughes, Eshleman, Witchen, & Kendler, 1994). A question assessed current general physical health ("Thinking of your physical health would you say that, in general, it is excellent, very good, good, fair or poor"). Measures of social stratification included education (in years as well as highest degree held, using the question: "What is the highest grade in school or year of college that you completed?") and income (determined with two questions on total annual personal and household income).

Two sources of data, one secondary and one primary source, were integrated into an organizational characteristics database and linked to individual Nursing Assistants' records using nursing home as the variable of linkage. The Nursing Home Compare Database based on the Center for Medicaid and Medicare Services (CMS) On-line Survey Certification of Automated Records and Minimum Data Set[3] provided information on type of ownership (For-profit vs Not-for-profit). We also administered the organizational survey, using an adaptation of a questionnaire used in a previous study of human services organizations (Söderfeld, *et al.*, 1997) to key informants in each nursing home during the data collection period. Questions in the organizational survey asked about presence in the nursing home of a bureaucratic management style, i.e., "by the book," labor relations violations, perceptions of labor management conflict, and seniority based wage increases. These three indicators were combined into a single additive scale "manage-

[3]Nursing Homes Compared. Retrieved August 25, 2003.

rial pressure" indicator. All organizational-level variables were operationalized as categories for multivariate analyses.

*Data Analysis*

Data analyses were conducted in sequential steps using linkage, exploratory data analyses, and multilevel analyses. Missing data were addressed using listwise deletion. Exploratory and descriptive analyses involved preliminary univariate, bivariate, and multivariate analyses to describe the sample, explore associations between depression, work organization, and organizational attributes. Next, multilevel models were used because the measurement of Nursing Assistants' depression within nursing homes has a hierarchical structure (Söderfeldt, *et al.*, 1997). Multilevel models take into account this natural clustering, allow the effect of individual level variables on depression to vary across nursing homes, and use organizational-level variables to explain the difference in individuals' baseline risk and the differential effect of individual level variables on depression. A statistical software package (Multilevels Models Project, 2000) was used to implement the model, in which iterative generalized least squares was used to find maximum likelihood estimates of the parameters using an iterative process and MQL methods through the use of iterative generalized least squares. The model was built in stages, starting from a simple variance components model, and successively adding to the model the fixed effects and random effects for the variables of interest at different levels. Diagnostic procedures were explored in the final model at both organizational and individual levels, including testing model assumptions, detecting outliers, and influence of individual data points on model fit. Appendix I (p. 601) illustrates how the mixed-effects two-level model was built.

## Results

Descriptive statistics on selected variables are presented for the sample in Table 1. Nursing assistants are mostly women, less than 45 yr. old, have a high school education, are white non-Hispanic, with low household incomes, work in for-profit nursing homes, and do not have seniority wage increases. Approximately half of them are married and self-report good health but present symptoms of Major Depressive Disorder.

Table 2 lists regression estimates for three nested two-level models for Depressive Disorder and Depressive Symptoms, respectively. Table 2 is used as the example here. The definitions of the variables are listed in Table 1 and a detailed explanation of the models is provided in Appendix I (p. 601). The variance components model was examined first with random intercepts only, then successively adding fixed and random effects for the variables of

TABLE 1

SAMPLE DESCRIPTION: NUMBER AND PERCENT OF PARTICIPANTS BY INDIVIDUAL AND ORGANIZATIONAL CHARACTERISTICS AND GROUPED BY DEPRESSION AND EMOTIONAL STRAIN

| | Variable | *n* | % |
|---|---|---|---|
| Individual Level | | | |
| Age ($N=395$) | <45 yr. | 245 | 62.0 |
| | 45 and over | 150 | 38.0 |
| Sex ($N=395$) | Women | 378 | 95.7 |
| | Men | 17 | 4.3 |
| Marital status ($N=392$) | Married first time | 141 | 36.0 |
| | Married with previous marriage | 65 | 16.6 |
| | Divorced/separated | 77 | 19.6 |
| | Widowed | 12 | 3.1 |
| | Never married | 76 | 19.4 |
| | Living as if married | 21 | 5.4 |
| Education ($N=394$) | Elementary school | 0 | 0.0 |
| | Junior high school | 47 | 11.9 |
| | High school | 267 | 67.8 |
| | Junior college or 1-2 years college | 74 | 18.8 |
| | College graduate | 6 | 1.5 |
| | Graduate school | 0 | 0.0 |
| Hispanic ($N=395$) | Yes | 12 | 3.0 |
| | No | 383 | 97.0 |
| Race ($N=381$) | American Indian or Alaska native | 10 | 2.6 |
| | Asian | 1 | .3 |
| | Black or African American | 43 | 11.3 |
| | Native Hawaiian or other Pacific Islander | 4 | 1.0 |
| | White | 323 | 84.8 |
| Overall health ($N=388$) | Excellent | 26 | 6.7 |
| | Very good | 111 | 28.6 |
| | Good | 155 | 39.9 |
| | Fair | 70 | 18.0 |
| | Poor | 26 | 6.7 |
| Household income for past year ($N=379$) | ≤ $10,000 | 28 | 7.4 |
| | ≤ $15,000 | 83 | 21.9 |
| | ≤ $20,000 | 61 | 16.1 |
| | ≤ $25,000 | 66 | 17.4 |
| | ≤ $35,000 | 68 | 17.9 |
| | ≤ $50,000 | 44 | 11.6 |
| | ≤ $60,000 | 17 | 4.5 |
| | ≤ $75,000 | 10 | 2.6 |
| | ≥ $75,000 | 2 | .5 |
| Organizational Level | | | |
| Ownership type ($N=395$) | For profit | 302 | 76.5 |
| | Nonprofit | 93 | 23.5 |
| Seniority wage increase ($N=295$) | Yes | 86 | 29.2 |
| | No | 209 | 70.8 |
| Managerial pressure ($N=252$) | Yes | 206 | 81.7 |
| | No | 46 | 18.3 |

(continued on next page)

TABLE 1 (CONT'D)
SAMPLE DESCRIPTION: NUMBER AND PERCENT OF PARTICIPANTS BY INDIVIDUAL AND ORGANIZATIONAL CHARACTERISTICS AND GROUPED BY DEPRESSION AND EMOTIONAL STRAIN

| Variable | | *n* | % |
|---|---|---|---|
| Depressive symptoms using CES–Depression cutoff ≥ 16 ($N=392$) | Depressed | 234 | 59.7 |
| | Not depressed | 158 | 40.3 |
| Depressive Disorder using revised CES–Depression cutoff ≥ 16 ($N=392$) | Depressed | 238 | 60.7 |
| | Not depressed | 154 | 39.3 |
| Emotional Strain ($N=393$) | Low emotional strain | 301 | 76.6 |
| | High emotional strain | 92 | 23.4 |

interest to improve model fit and to reduce the random effect variation via MQL methods.

In Model 1 is demonstrated the variation of the baseline risk is statistically significant: the estimated variance of the random intercept is 0.34 with a standard error of 0.14. Model 2 adds individual variables, i.e., emotional demand adjusted by age, marital status, and race. This model shows that there is minimal random effect of emotional demand among nursing homes, but that the fixed effect of emotional demand is significant (1.30; 0.30).

TABLE 2
REGRESSION COEFFICIENTS WITH STANDARD ERRORS FOR MULTILEVEL LOGISTIC REGRESSION ANALYSIS OF DEPRESSIVE DISORDER ($N=394$)

| Variable | Model 1* | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | B | *SE* | B | *SE* | B | *SE* |
| Fixed Effect | | | | | | |
| Intercept | 0.344 | 0.144 | 0.490 | 0.207 | –0.034 | 0.646 |
| Emotional strain | | | 1.299 | 0.302* | 1.007 | 0.370* |
| Age group | | | –0.396 | 0.230 | –0.523 | 0.292 |
| Marital status | | | –0.291 | 0.230 | –0.298 | 0.292 |
| Race group | | | –0.351 | 0.321 | –0.187 | 0.409 |
| Nursing home | | | | | | |
| Ownership type | | | | | 0.619 | 0.484 |
| Seniority wage increase | | | | | 0.102 | 0.374 |
| Managerial pressure | | | | | 0.231 | 0.426 |
| Random Effect Variances | | | | | | |
| Level 2 Intercept variance | 0.387 | 0.189 | 0.255 | 0.168 | 0.169 | 0.182 |
| Level 2 Emotional strain variance | | | 0.000 | 0.000 | 0.000 | 0.000 |
| Model Fit | | | | | | |
| Quasi-likelihood deviance | 537.08 | | 481.09 | | 307.46 | |
| $\Delta D$ | | | 56.00 | | 173.60 | |
| $\Delta df$ | | | 4 | | 3 | |
| $p$ for $\chi^2$ | | | < .0001 | | < .0001 | |

*Null model.

Compared with Model 1, Model 2 shows little reduction of variation in baseline risks (0.30 vs 0.26) when adding the individual variables. Therefore, we add level 2 variables, potentially to explain the variation in baseline risks (Model 3), namely, ownership type, management style and availability of seniority wage increases. Three important results are shown: first, the fixed effect of emotional demand remains significant after adjustment by level 2 variables. Second, all three level 2 variables are not statistically significantly related to Depressive Disorder independently from individual-level variables. Third, the variations of the baseline risk (0.17) and the odds ratio associated with emotional demand across all the nursing homes were estimated to be minimal (estimated variance = 0), implying that after the inclusion of the nursing home variables as fixed effects, the random variation across nursing homes is reduced. Next, comparing quasi-likelihood scores among Models 1, 2, and 3 indicate that fit was improved significantly as tested by the chi-square test. Model 3 is the final model for Depressive Disorder (revised CES–Depression). For Depression Symptoms, quite similar results were found (Table 3).

TABLE 3
REGRESSION COEFFICIENTS WITH STANDARD ERRORS FOR MULTILEVEL LOGISTIC REGRESSION ANALYSIS OF DEPRESSIVE SYMPTOMS ($N = 394$)

| Variable | Model 1* | | Model 2 | | Model 3† | |
|---|---|---|---|---|---|---|
| | B | *SE* | B | *SE* | B | *SE* |
| Fixed Effect | | | | | | |
| Intercept | 1.781 | 0.194 | 2.067 | 0.321 | 1.588 | 0.845 |
| Emotional strain | | | 1.566 | 0.558* | 1.528 | 0.760* |
| Age group | | | –0.937 | 0.318* | –1.239 | 0.435* |
| Marital status | | | –0.301 | 0.320 | –0.354 | 0.441 |
| Race group | | | 0.327 | 0.480 | 0.753 | 0.691 |
| Nursing home | | | | | | |
| Ownership type | | | | | 0.330 | 0.650 |
| Seniority wage increase | | | | | –0.121 | 0.464 |
| Managerial pressure | | | | | 0.796 | 0.498 |
| Random Effect Variances | | | | | | |
| Level 2 Intercept variance | 0.635 | 0.340 | 0.792 | 0.396 | 0.000 | 0.000 |
| Level 2 Emotional strain variance | | | 0.000 | 0.000 | 0.000 | 0.000 |
| Model Fit | | | | | | |
| Quasi-likelihood deviance | 259.79 | | 151.57 | | 50.06 | |
| $\Delta D$ | | | 108.20 | | 101.50 | |
| $\Delta df$ | | | 4 | | 3 | |
| $p$ for $\chi^2$ | | | < .0001 | | < .0001 | |

*Null model. †Full model.

Tables 4 and 5 present odds ratios and associated confidence intervals of Depressive Disorder and Depressive Symptoms for individual and organizational variables. Results confirmed the hypothesis regarding the association

TABLE 4
ADJUSTED* MULTILEVEL ODDS RATIOS OF INDIVIDUAL AND ORGANIZATIONAL FACTORS ASSOCIATED WITH DEPRESSION DISORDER

| Factor | Depressive Disorder (Revised CES–Depression) | |
|---|---|---|
| | Odds Ratio | 95% CI |
| Individual Level | | |
| Emotional strain | 2.74 | 1.33, 5.65 |
| Organizational Level | | |
| For-profit status | 1.86 | 0.72, 4.80 |
| No seniority based wage increases | 1.11 | 0.53, 2.30 |
| Managerial pressure | 1.26 | 0.55, 2.90 |

*Adjusted for age, race, and marital status.

of emotional strain with depression, but not our hypothesis regarding organizational level characteristics with depression. The odds of depressive disorder among Nursing Assistants with high Emotional Demand are 2.7 times higher than Nursing Assistants with lower Emotional Demand, adjusted for age, race and marital status, and independent of nursing home characteristics.

TABLE 5
ADJUSTED* MULTILEVEL ODDS RATIOS OF INDIVIDUAL AND ORGANIZATIONAL FACTORS ASSOCIATED WITH DEPRESSION SYMPTOMS

| Factor | Depressive Symptoms (CES–Depression) | |
|---|---|---|
| | Odds Ratio | 95% CI |
| Individual Level | | |
| Emotional strain | 4.61 | 1.04, 20.44 |
| Organizational Level | | |
| For-profit status | 1.39 | 0.39, 4.97 |
| No seniority based wage increases | 0.89 | 0.36, 2.20 |
| Managerial pressure | 2.22 | 0.84, 5.88 |

*Adjusted for age, race, and marital status.

Organizational-level characteristics are not significantly associated with Depressive Disorder ($p = .05$). The odds of Depressive Symptoms among Nursing Assistants with high Emotional Demand are 4.6 times higher than Nursing Assistants with lower Emotional Demand, adjusted for age, race, and marital status and independently from nursing home characteristics. Organizational-level characteristics are not significantly associated with Depressive Symptoms.

## DISCUSSION

Results supported the hypothesis regarding the association of emotional strain with depression. As predicted, health services occupations, such as nursing assistants, include emotional labor as a prominent stressor (Shuler &

Davenport, 2000). Workplace emotional demands were associated with symptoms of depression, confirming previous theoretical amendments of the demand/control model in human services (Söderfeldt, Söderfeldt, Muntaner, Campo, & Ohlson, 1996; De Jonge, Van Breukelen, Landweerd, & Nijhuis, 1999). Therefore the job strain model potentially benefits from adding emotional demands to the assessment of job strain when the occupation of interest is in human services.

Nursing assistants working in nursing homes showed a high prevalence of depressive symptoms (57%), which were higher than national population estimates (National Institute of Occupational Health and Safety, 2000). Given the high scores presented by the Nursing Assistants, this occupation should be targeted for prevention efforts, whether the cause might be the nature of the job (caring for sick and frail elderly), organizational characteristics, or social structural characteristics such as lower socioeconomic status or a combination.

Workplace Emotional Demand, however, was not significantly associated with Depressive Symptoms in our sample of nursing assistants working in nursing homes. This finding does not confirm that work organization is an important correlate of mental health in health care workplaces (Landsbergis, 1988, 2003). However, the present sample was vulnerable to selection bias.

The set of organizational-level predictors of Nursing Assistants' depression included labor management relations, i.e., managerial pressure, seniority wage increases, and labor market characteristics of the business (ownership type). Managerial pressure had already been related to workers' mental health, albeit previous studies had relied on worker self-reports (Cooper & Earnshaw, 1998). Lack of seniority wage increases result in long term financial strain in an already low wage occupation, and financial strain is a strong longitudinal predictor of depression among U.S. women (Eaton, *et al.*, 2001). Ownership type has in the past been associated with patient outcomes in nursing homes (e.g., Harrington, 2001; Harrington, *et al.*, 2001); however, this study does not extend such findings to nursing home workers. This sample may not have enough variation in ownership type or may be lacking in statistical power to find significant differences.

To date, few studies on the health effects of work organization in nursing homes have simultaneously examined two levels of data (e.g., Banaszak-Holl & Hines, 1996), and none were known to have used appropriate statistics for their analysis. Here also were used statistical methods for assessment of organizational effects that address the clustering of individuals within organizations (Söderfeldt, *et al.*, 1997).

Among the limitations of this study is a cross-sectional design. Nevertheless, reverse-causation explanations are unlikely to hold, e.g., that less de-

pressed nursing assistants would know about, have the possibility of choice, and actively seek less organizationally hazardous nursing homes. There is also the possibility of self-report bias in the assessment of job strain. However, previous research has shown high correlations between self-report and independent ratings of job demands and control (Eaton & Garrison, 1993). In addition, self-reports are necessary for assessing emotional labor (Shuler & Davenport, 2000). The possible bias introduced by studying unionized nursing homes could have produced a less healthy sample, as unionization seems to occur more easily in hazardous workplaces (Hodson & Sullivan, 1995). Nevertheless, in a study using government (CMS and Workers Compensation) databases, no differences were found in injury rates between the nursing homes used in this study and the rest of nursing homes in the state of West Virginia (Trinkoff, Johantgen, Muntaner, & Lee, 2005). It is possible that unmeasured heterogeneity is a problem in these analyses; however, this sample was divided by race, income, management style, and gender which should reduce the potential for unmeasured heterogeneity. A selectivity bias may be present as a single union's membership list was used, thereby not allowing us to compare our sample with other unions or nonunionized Nursing Assistants.

An integrated approach to prevention that encompasses both compensation and emotional strain simultaneously is more likely to be successful than an approach that focuses only on the work organization. But even if issues of compensation and benefits are not addressed, this study of the effects emotional strain on nursing home workers' mental health provides initial evidence for the need of work interventions. These interventions include reduced workload, participatory management that increases nursing assistants' autonomy, additional training, safer work environment, Employee Assistance Plans (which offer counseling services to employees), and career ladders; to ensure adequate staffing to reduce demands, and other changes in the organization of work to ensure an environment that reduces emotional strain. These interventions would help both employees' and nursing home residents' well being. The significant correlation between age and emotional strain may in part be explained by the fact that people who have been in the profession longer have had more opportunities for both emotional strain and depression. However, examination of this correlation is necessary to test this argument.

Researchers should look into creating interventions at the nursing home level to reduce emotional strain and depression through changes in working conditions. Research on the specific pathways of emotional strain and depression and the effect the workplace has in moderating or mediating this connection should also be explored. Researchers should also investigate the emotional strain associated with being a Nursing Assistant among a larger

sample which would include unionized and nonunionized workers. Researchers should also attempt to find ways to help Nursing Assistants deal with the stressful situations they encounter daily in a very difficult and important occupation.

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# APPENDIX I

## Multilevel Modeling

*Model 1*

We start with a simplest multilevel model with no individual variables and organizational level variables, allowing the risk of depression to vary across nursing homes. The first level model is Logit $P_{ij} = \beta_{0i}$ and the second level model is $\beta_{0i} = \gamma_{00} + \mu_{0i}$, then the combined model becomes

$$\text{Logit } P_{ij} = \gamma_{00} + \mu_{0i} \quad [1]$$

where $\gamma_{00}$ is the average baseline level of risk, and $\mu_{0i}$ represents the deviation of the $i^{th}$ nursing home from the average and random effect $\mu_0$ is assumed to follow a normal distribution, with mean of zero and an unknown constant variance. The variation of $\mu$ indicates the amount of variability across nursing homes, and therefore the correlation among individuals from the same nursing home. The multilevels modeling software simultaneously estimates all the fixed effects $\gamma$s, and the variance of random effects $\mu$s (see Model 1 presented in Table 2).

*Model 2*

To allow the risk of depression to vary with individual level variables, we include individual variables such as emotional demands, *ED*, in the first level model Logit $P_{ij} = \beta 0_i + \beta_{1i} ED_{ij}$ and to allow both the baseline risk and the odds ratio associated with *ED* to vary across nursing homes, gives $\beta_{0i} = \gamma_{00} + \mu_{0i}$, $\beta_{1i} = \gamma_{10} + \mu_{1i}$. The combined model then becomes

$$\text{Logit } P_{ij} = \gamma_{00} + \gamma_{10} \ ED_{ij} + \mu_{1i} ED_{ij} \quad [2]$$

where $\gamma_{10}$ is the average log odds ratio associated with *ED* (may also be referred to as the fixed effect of *ED*), and $\mu_{1i}$ represents the deviation of the *i*th nursing home from the average and the random effect ($\mu_0$, $\mu_1$) is assumed to follow a multivariate normal distribution, with zero mean and an unknown variance-covariance matrix (model corresponds to Model 2 presented in Table 2).

*Model 3*

The group level variable, such as ownership type of nursing home (OT), may be used to explain the heterogeneity in baseline risks for depression across the nursing homes such that $\beta_{0i} = \gamma_{00} + \gamma_{01} OT_i + \mu_{0i}$, in this case, the combined model becomes

$$\text{Logit } P_{ij} = \gamma_{00} + \gamma_{01} OT_i + \gamma_{10} ED_{ij} + \mu_{0i} + \mu_{1i} ED_{ij} \quad [3]$$

where $\gamma$ represents the influence of ownership type on the log odds of the depression (Model 3 corresponds to Model 3 presented in Table 2).

*Model 4*

Further, if the differential odds ratio associated with emotional demands can be explained by organizational level variables, such as ownership type, we can model $\beta_{1i}$ as follows:

$$\beta_{1i} = \gamma_{10} + \gamma_{11} OT_i + \mu_{1i} \ .$$

Then the combined model becomes

$$\text{Logit } P_{ij} = \gamma_{00} + \gamma_{01} OT_i + \gamma_{10} ED_{ij} + \gamma_{11} OT_i ED_{ij} + \mu_{0i} + \mu_{1i} ED_{ij}$$

where $\gamma_{11}$ represents the influence of ownership type on the log odds ratio of the depression associated with emotional demands. The successive construction of the multilevel models is based on the improvement of model fit and the reduction of random effect variations.