Back Pain in Direct Patient Care Providers: Early Intervention with Cognitive Behavioral Therapy

Nancy N. Menzel, PhD, RN, and Michael E. Robinson, PhD†*

Abstract:

Back pain and injury are a widespread problem for direct care providers and can lead to disability and job loss. Although most intervention studies focus on the number of reported injuries as the outcome variable, pain is a leading indicator of impending injury. More secondary prevention interventions focusing on early detection and treatment of pain are needed to reduce injuries. The primary aim of this study was to assess the feasibility and effect size of a cognitive behavioral therapy (CBT) intervention to reduce the measures of back pain, stress, and disability in direct care providers working with back pain. The secondary aim was to assess the association between affect and outcome variables, particularly unscheduled work absence, which is a component of disability. This randomized clinical trial recruited 32 registered nurses and nursing assistants with a history of back pain in the past year and assigned them to either an intervention or a control group. The CBT intervention was a weekly stress and pain management session over 6 weeks led by a clinical psychologist. Data for both groups were collected at baseline and at 6 weeks, with work absence data caused by back pain self-reported for 12 weeks. Pain intensity scores declined in the intervention group, indicating a large effect. However, stress scores increased. Depression scores accounted for one-third of the variance in hours absent because of back pain. Although there was a high dropout rate in the intervention group, a cognitive-behavioral intervention shows promise as a secondary prevention intervention.

*From the *University of Florida, College of Nursing, and †College of Public Health and Health Professions, Department of Clinical and Health Psychology, Gainesville, Florida.*

Address correspondence and reprint requests to Nancy N. Menzel, PhD, RN, University of Florida, College of Nursing, Department of Health Care Environments and Systems, PO Box 100187, Gainesville, FL 32610. E-mail: nmenzel@nursing.ufl.edu.

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Registered nurses (RNs), licensed practical nurses, and nursing aides/certified nursing assistants (NAs) around the world have a high prevalence of back and other musculoskeletal pain (Menzel, 2004). In the United States, NAs rank second and RNs rank tenth among all occupations for the greatest number of

nonfatal work-related musculoskeletal disorders (WMSDs) resulting in days away from work (US Department of Labor Bureau of Labor Statistics, 2005). Among direct patient care providers in hospitals and nursing homes, the trunk is the most frequently injured body part, and patient handling is the source of injury (Daraiseh et al., 2003; US Department of Labor Bureau of Labor Statistics, 2005).

After an injury, many direct care providers leave the field, either temporarily or permanently (Helmlinger, 1997; Lewis, 2002). With the current RN shortage projected to worsen and demand for NAs increasing (US Department of Health and Human Services Health Resources and Services Administration, 2004), efforts to protect current workers from pain and disability that may cause them to leave their jobs are key to meeting the country's increasing need for nursing services at all levels.

Although many descriptive studies have documented the scope of the problem by identifying the high prevalence of work-related back pain in this population (Menzel, 2004), most intervention studies do not use pain as the outcome variable, instead focusing on injury incidence (Collins et al., 2004; Yassi et al., 2001). This is understandable because such injuries result in direct employer costs that can be quantified, unlike the indirect costs of back pain—such as reduced productivity. However, compared with the 1-year prevalence of back pain—for example, 47% in RNs (Trinkoff, Lipscomb, Geiger-Brown, & Brady, 2002)—1-year back injury incidence rates are four to five times lower than prevalence rates (US Department of Labor Bureau of Labor Statistics, 2005). To prevent back pain from progressing to the point that a direct care provider reports a back injury, intervention research should focus on the stage of early pathogenesis, when early detection of damage is possible through assessment of back pain symptoms.

MULTIFACTORIAL CAUSE OF BACK PAIN AND INJURY

One of the major difficulties in reducing back pain and WMSDs is their multifactorial cause (National Institute for Occupational Safety and Health, 1997; National Research Council and Institute of Medicine, 2001; World Health Organization, 1985). Many studies have identified biomechanical load (e.g., lifting heavy patients) as a risk for back injury (Ulin et al., 1997; Winkelmolen, Landeweerd, & Drost, 1994; Zhuang, Stobbe, Hsiao, Collins, & Hobbs, 1999).

However, there is also evidence that psychosocial stress has a risk similar to that of a biomechanical load. In a study that held physical workplace characteristics constant (Davis, Marras, Heaney, Waters, & Gupta, 2002), performing complex mental tasks simultaneously with lifting produced a significant increase in spinal loading. The authors hypothesized that mental stress may initiate a biomechanical response. In a study of 25 participants, laboratory-manipulated psychosocial stress increased muscle coactivation, which increased spinal compression in some participants, particularly in females and those with certain personality types (Marras, Davis, Heaney, Maronitis, & Allread, 2000). The authors concluded that this study might have identified the link between psychosocial stress and spine loading.

High workloads and unpleasant working conditions produce stress and job dissatisfaction in patient care providers (Bryant, Fairbrother, & Fenton, 2000; Daraiseh et al., 2003; Fox, Dwyer, & Ganster, 1993; Taylor, White, & Muncer, 1999). One study (Ahlberg-Hulten, Theorell, & Sigala, 1995) found that low back pain symptoms in 90 RNs and NAs were associated with high demands and low control in their jobs.

COGNITIVE BEHAVIORAL THERAPY FOR PAIN AND DISABILITY

WMSDs are associated with both pain and disability, concepts that are often related but not synonymous. Pain has sensory, affective, and cognitive dimensions. Its clinical assessment is through subjective reports. "Disability is restricted function and can be assessed reliably by clinical interview, questionnaire, or work loss" (Waddell, Newton, Henderson, Somerville, & Main, 1993). Although disability is almost always based on physical impairment, with chronic low back pain there may be no objective structural impairment (Waddell, Somerville, Henderson, & Newton, 1992). A study by Waddell and colleagues (1993) showed little association between pain and disability. Another study (Tate, Yassi, & Cooper, 1999) found that perceived disability in back-injured nurses predicted whether lost work time would occur, and self-reported pain predicted the length of lost time.

Cognitive behavioral therapy (CBT) for chronic pain has received considerable empirical support (Flor & Birbaumer, 1993; Flor, Fydrich, & Turk, 1992), and the American Psychological Association has endorsed it as an evidence-based behavioral treatment (O'Donohue, Buchanan, & Fisher, 2000). CBT is based on the premise that cognition influences both emotion and behavior. Several cognitive styles or thinking patterns have been identified as particularly maladaptive and related to poor outcomes, distress, and likelihood of injury (Geisser, Robinson, & Riley, 1999). CBT is a multimodal treatment aimed at replacing maladaptive

thinking patterns with more adaptive patterns and replacing maladaptive behavior patterns with functional alternatives. Among the behaviors that CBT has been effective in altering are those such as exercise participation, relaxation skills, and fear-avoidance of movements that are critical to adjustment to pain and injury. Both group and individual versions of CBT have been shown to be effective, although group versions have received more study (Cipher, Fernandez, & Clifford, 2001; McCracken & Turk, 2002).

The therapy has been shown to affect emotional, pain behavior, and health care use outcomes. The CBT outcome literature has been extensively reviewed (Cipher, Fernandez, & Clifford, 2001; Flor, Fydrich, & Turk, 1992; McCracken & Turk, 2002). Findings from those reviews have been remarkably consistent with all reviews showing positive outcomes on self-report measures of pain, mood, and disability. In addition, Cipher, Fernandez, and Clifford (2001) focused on the more "objective" indicators of health care use, and showed that multidisciplinary programs that included CBT were significantly less costly posttreatment compared with uni-disciplinary interventions (primarily pain medication). McCracken and Turk (2002) noted the strong empirical support for CBT treatments, and urged investigators to focus on new strategies and combinations of interdisciplinary treatments for further improve outcomes. In particular, they noted a need for improved prediction of outcome and for treatment tailoring based on prospective predictors.

This pilot study was important for directing attention to the psychosocial domain because federal regulators and researchers have to date focused almost exclusively on reducing only the physical risk factors associated with back injuries in nursing (e.g., weight of the load lifted, lift frequency, awkward postures) and not on psychosocial risk factors. For example, the Occupational Safety and Health Administration has issued guidelines recommending the installation and use of lifting devices in nursing homes, while making no recommendations that would result in reducing psychosocial stress (Occupational Safety and Health Administration, 2003). In 2001, the National Institute for Occupational Safety and Health National Occupational Research Agenda Musculoskeletal Disorders Team identified seven research priorities, none of which addressed the psychosocial domain. The team's description of the research issues in the health care industry also omits any mention of the need for assessing the effectiveness of psychosocial interventions, while at the same time acknowledging that lifting interventions alone have not eliminated the problem of WMSDs (National Institute for Occupational Safety and Health, 2001).

RESEARCH AIMS

The primary aim of this study was to assess the feasibility and effect size of a cognitive behavioral intervention to reduce the outcome variables of stress, pain, and disability in RNs and NAs working with WMSDs. Unlike other studies before 2003 that had assessed CBT as a treatment for those with chronic pain undergoing rehabilitation during work loss or modification (tertiary prevention) (Kole-Snijders et al., 1999; Linton & Andersson, 2000; Turner & Jensen, 1993), the focus of this study was on secondary prevention: screening and early intervention for those working with pain. The secondary aim was to assess the association among affect and outcome variables, particularly unscheduled work absences, a component of disability.

MATERIALS AND METHODS

Sample and Setting

This randomized clinical trial used a two-group repeated-measures design. The University of Florida Health Sciences Center Institutional Review Board approved the study. The sample included 27 female and 5 male RNs or NAs at a 550-bed tertiary care academic medical center in Florida. Inclusion criteria were a history of back pain in the past year, at least 80% of work time providing direct patient care, and working at least 30 hours a week. Because of our focus on secondary not tertiary prevention, those who were on modified duty for any reason were excluded. Participants were randomly assigned to either an intervention or wait list/control ("control") group. To be considered compliant with treatment, intervention participants were required to attend at least three of the six intervention CBT sessions. At the end of the 12-week study, we offered the CBT training to the control group for ethical purposes.

Instruments

To determine which of the many standardized instruments that measure stress, pain, disability, and affect were most appropriate for this population, we chose several that had been used to assess either these variables or nursing staff in other back pain studies. The reliability and validity of these instruments are in Table 1. Although there were 14 instruments completed at one time before and after the intervention, most were 1 page with a few 2 pages long. Participants required up to 1 hour to complete all the instruments (Table 1).

We relied on self-report data for many reasons. Pain is defined as "whatever the experiencing person says it is, existing whenever he or she says it does" (McCaffery, 2000), making self-report the measure of choice. Disability reflects the individual's assessment

Table 1.
Outcome Measures

Variable	Instrument	Reliability and Validity	Rationale for Selection
Pain	Coping Strategies Questionnaire (CSQ)	Main and Waddell (Main & Waddell, 1991) found that the instrument had adequate test/retest reliability (0.68 to 0.91 product moment correlations) in a sample of 120 patients with chronic low back pain. They identified the catastrophizing subscale as the most useful for understanding current low back symptoms. Stewart, Harvey, and Evans (2001) reported evidence of construct validity for the catastrophizing subscale, which they described as a measure of appraisal processes.	Addresses current back pain
	McGill Pain Questionnaire	Consists of three major classes of word descriptors—sensory, affective, and evaluative—that participants use to describe their subjective pain experience. This tool has demonstrated validity in acute pain (Lowe, Walker, & MacCallum, 1991).	Addresses acute back pain
	Nordic Musculoskeletal Questionnaire, Low Back	Reliability for the low-back version was reported as 0% to 4% non-identical answers after testing of 25 Scandinavian nursing staff members twice after a short interval. Validity was established by comparing employee responses with findings from clinical histories taken by a physical therapist and finding a high degree of correlation (Kuorinka et al., 1987).	This is the most commonly used symptom survey in the occupational health literature (Menzel, 2004).
	Visual Analog Scale of Pain	The VAS is a valid, reliable, and responsive pain scale instrument that is recommended for use in clinical trials (Scrimshaw & Maher, 2001).	Useful for measuring change in interventional research
	Intensity and Unpleasantness (VAS)	Respondents indicate on a 100-mm line the level of their pain intensity and on a second identical line, their pain unpleasantness. Some studies reported test/retest reliabilities as high as 0.99 (Huskisson, 1983). Its validity has been demonstrated repeatedly (Collins, Moore, & McQuay, 1997; Price, McGrath, Rafii, & Buckingham, 1983; Triano, McGregor, Cramer, & Emde, 1993).	
Stress	Perceived Stress Scale (PSS)	The PSS has documented validity and reliability in samples of women, which the sample was primarily (Cohen, Kamarck, & Mermelstein, 1983). In addition, it is short (14 items) and easy to administer. Studies using the PSS with women have reported test-retest correlation coefficients of $r = 0.85$, and a Cronbach's alpha of 0.84–0.86 (Tuck & Wallace, 2000).	This brief tool enables measurement of change in perceived stress over time.
	Work-Family Conflict Scale	This instrument measures work-family and family-work conflict with answers on a Likert scale to questions such as "My work takes up time I'd like to spend with family and friends." Alpha coefficients are 0.70 or greater (Parasuraman, Purohit, & Godshalk, 1996). In a study of nursing staff, researchers found significantly higher levels of work-family conflict than family-work conflict (Burke & Greenglass, 2001).	This tool was selected to assist in identifying sources of stress in this population to enable future modification of the intervention, if needed.
	Maslach Bumout Inventory Human Services Survey	Cronbach's alpha was 0.90 for Emotional Exhaustion, and the test-retest reliability coefficient was 0.82 (Maslach, Jackson, & Leiter, 1996). The high convergent validity of the Emotional Exhaustion subscale was determined by correlating outside observers' assessments with test scores (Maslach, Jackson, & Leiter, 1996).	This tool, which has been used in studies of nurses, is a measure of burnout (stress) and job satisfaction (Decker, 1997), which has been linked with low back pain (Bigos et al., 1991).

TABLE 1.
Continued.

Variable	Instrument	Reliability and Validity	Rationale for Selection
	Minnesota Satisfaction Questionnaire	An alpha of 0.79 was reported for the total job satisfaction score, with a 1-week test-retest coefficient of 0.89. Construct validity testing was based on the theory of work adjustment (Weiss, Dawis, England, & Lofquist, 1967).	This tool measures general job satisfaction, which has been linked to low back pain (Bigos et al., 1991).
Disability	Oswestry Low Back Pain Disability Questionnaire	The Oswestry has been recommended as a standardized outcome measure for low back pain research (Bombardier, 2000; Deyo et al., 1998). In a study of 100 patients with low back pain, an acceptable internal consistency value of 0.71 was reported (Strong, Ashton, & Large, 1994). Its content validity and responsiveness have been confirmed in numerous studies of patients with low back pain (Haas, Jacobs, Raphael, & Petzing, 1995; Triano, McGregor, Cramer, & Emde, 1993).	To allow comparison of results with numerous other low back pain studies
	Pain Disability Index (PDI)	This seven-item questionnaire has been used extensively to assess disability in patients injured at work (Chibnall & Tait, 1994). An acceptable internal consistency value of 0.76 for the PDI has been reported (Strong, Ashton, & Large, 1994). Its validity has been demonstrated (Chibnall & Tait, 1994; Tait, Chibnall, & Krause, 1990), and it has been used as a criterion for determining validity of other pain disability instruments (Wheeler, Goolkasian, Baird, & Darden, 1999).	This tool is appropriate to measure work-related, in contrast with general, disability.
	Unscheduled Absence Log	This log requested participants to record work hours lost because of back pain. It was pilot tested with six RNs before its use in this study.	Work loss is an important dimension of disability.
Mood	Beck Depression Inventory (BDI)	The Beck Depression Inventory (BDI) is a widely used and recognized self-report measure of depression. We have demonstrated the BDI to be a valid instrument for use with patients with chronic pain (Geisser, Roth, & Robinson, 1997).	Because pain is associated with negative affect, we assessed depression. Depression has been identified as a strong predictor of the transition from acute to chronic low back pain (Pincus, Burton, Vogel, & Field, 2002). We wanted to assess the relationship between pain and lost workdays as well.
	State-Trait Anxiety Inventory (STAI)	This tool measures anxiety in adults (Performance Assessment Network, 2003). A study of older adults found Chronbach's alpha coefficients of .94 and .88 for the State and Trait scales respectively (Stanley, Beck, & Zebb, 1996). Criterion validity is adequate, measuring five of the eight domains for Generalized Anxiety Disorder (DSM-IV) (Okun, Stein, Bauman, & Silver, 1996).	Anxiety is one of the affective components of pain.

RN, Registered Nurse.

of whether he or she can perform identified activities without restriction. Objective tests for back impairment do not correlate highly with disability measures, with some individuals reporting severe disability with no objective signs of impairment (Pengel, Refshauge, & Maher, 2004). Although there are biophysiologic tests for stress (e.g., salivary cortisol), our focus was on the individual's perception of his or her stress levels, not the adrenal system's response. The best way to determine an individual's job satisfaction is self-report.

In addition, we asked participants to complete a 1-page demographic information sheet before the study's start and to mail in biweekly unscheduled work absence logs indicating their assigned schedules and any absences resulting from back pain. Because the study facility would not release this information, self-report data were the only alternative. Session attendance data were collected for 12 weeks once sessions began. Compliance with attending the scheduled sessions was used to assess feasibility.

TABLE 2.
Session Topics and Target Variables

Topic	Variable
Relaxation techniques, including progressive muscle relaxation	Stress, depression
Activity rest cycles, engaging in pleasant activities, time management	Stress
Distraction techniques, cognitive restructuring mini-relaxation on the job	Pain
On-the-job stress management, conflict management and resolution	Stress, job satisfaction
Assertiveness training, communication skills, problem solving	Job satisfaction
Sleep hygiene/nutrition/exercise	Stress, depression

Intervention

We offered the intervention group stress and pain management small group sessions led by psychologists. Sessions were held at the medical center and offered one day per week either mid-afternoon (before the evening shift began) or late afternoon (after the day shift ended). The first set of sessions was offered after 16 participants were recruited, and another set of sessions was offered when the final 16 were recruited. Initial session sizes ranged from 4 to 6 participants. The two series of intervention sessions were delivered sequentially between September 2003 and December 2003. Session content was adapted from a successful stress and pain management program for patients with chronic pain at the University of Florida Spine Center and Psychology Clinic (Swimmer, Robinson, & Geisser, 1992). That program involves 1-hour sessions over 9 weeks, followed by periodic booster sessions. To make this intervention more attractive for participants, we shortened the series length but included the 9 hours of content from that program in 1.5-hour sessions over a 6-week period. Time and financial constraints precluded offering booster sessions. Topics covered are in Table 2.

The group leaders worked with standardized session outlines, encouraged group discussion, and gave participants prepared materials (reading, audiotapes) for homework assignments. Group leaders sent the Principal Investigator (PI) weekly attendance records. The PI called those absent after their first absence to remind them about the sessions. On completion of data collection, the sessions were offered to the control group. All participants, including the control group, were paid $17 per hour for study activities as an incentive. This hourly reimbursement was less than an RN earned at the study facility but more than an NA earned before factoring in additional childcare or transportation costs.

Data-collection Procedures

We used posters, e-mail, and in-person requests to recruit participants. Before the start of the intervention, participants met with us to sign informed consents and complete the initial set of written questionnaires. Within 1 week of the session series ending, participants completed the same questionnaires. All participants were instructed to submit the unscheduled absence logs for 12 weeks beginning when sessions started for the intervention group.

Data Analysis

SPSS 11.0.1 (SPSS Inc., Chicago, Ill) computed demographic and Nordic Musculoskeletal Discomfort data frequencies and descriptive statistics. We used repeated-measures analysis of variance to assess between-subject and within-subjects differences in outcome measures to determine the effect size of the CBT intervention. Separate analyses of variance were run for each dependent variable based on *a priori* hypotheses about each construct. Group membership served as the between-subjects factor, and time (pretreatment vs. posttreatment) served as the within-subjects factor. To examine the magnitude of effects, eta^2 was calculated for each main and interaction effect. Ordinary least squares regression was used to investigate the relationship between depression (Beck Depression In-

TABLE 3.
Visual Analog Scale of Pain Intensity Results

Variable	Instrument	Group (n)	T_1 Mean (SD)	T_2 Mean (SD)	Change	Effect size (% variance time x group)
Pain intensity	VAS pain intensity	1 (8)	48.75 (31.09)	37.25 (24.43)	−10.50	Large (20%)
		C (10)	36.00 (26.04)	45.00 (26.75)	+9	

I, Intervention; C, control; *SD,* Standard deviation; *VAS,* Visual Analog Scale.

ventory) scores and work absence (number of hours) resulting from back pain.

RESULTS

The mean age of participants was 40.3 years, and they worked an average of 42.0 hours per week. Approximately 60% were RNs, with the remainder NAs. Although 26% reported they had had low back trouble lasting only 1 to 7 days in the last year, another 26% reported they had experienced back pain every day during that time. The rest of the participants reported frequencies between these two extremes.

Although we requested that even those intervention group participants who did not attend the required minimum number of sessions (3) complete final questionnaires, only one of the eight participants who stopped attending sessions did so. Those who stopped attending gave various reasons, including child care difficulties, opportunities to earn higher overtime pay, and unwillingness to attend sessions on days they were not already scheduled to work. We analyzed the data both with and without the one participant who stopped attending sessions the second week but completed a final set of questionnaires and found no significant differences in outcomes. Seventy-five percent of the control group completed the second set of questionnaires. The noncompleters did not return telephone calls or respond to letters asking them to contact the PI.

In the whole sample, there were no statistically significant differences at baseline in demographics or outcome variables between study completers and noncompleters. Participants who completed the sessions commented on how helpful they found the skills they were taught but found the times, class length, and limited number of days offered inconvenient for their constantly changing work schedules.

We calculated effect sizes and statistical significance on primary aim outcome measures. Noteworthy among them were that Visual Analog Scale (VAS) for pain intensity (0 = no pain at all, 100 = most intense pain imaginable) scores declined 11 points (11%) between the start and end of the 6-week study period in the intervention group but increased by 9 points in the control group, indicating a large effect in the expected direction (20% of the variance attributable to the interaction effect of *time x group*). However, the difference was not significant ($p = .06$) because of our small sample size (Table 3).

There was a significant interaction effect of *time x group* for scores on the Perceived Stress Scale accounting for 21% of the variance, but the changes in scores were not in the expected directions. The intervention group's scores increased by 1 point, whereas the control group's decreased by 4 points ($p < .05$). We theorize two reasons: (1) the intervention group found the personal time required to attend sessions increased their personal stress levels or (2) the instrument focuses on personal stress, not work-related stress, the target of the CBT intervention. There was no effect on anxiety measures.

Although there were no significant differences between groups at follow-up on any of the other measures, one did show a moderate effect size. The Personal Accomplishment subscale on the Maslach Burnout Inventory measures "feelings of competence and successful achievement in one's work with people" (Maslach, Jackson, & Leiter, 1996) and is a component of the burnout syndrome, a type of chronic stress. Scores increased 1.5 points in the intervention group, indicating increased feelings of personal accomplishment, and decreased 2.3 points in the control group (18% of the variance attributable to the interaction effect of time x group, $p = .06$). At the end of the study, the intervention group mean was 40, compared with a mean of 37 for the control group and a mean of 36.5 for health care workers nationally (Maslach et al., 1996).

Participants verbalized that the McGill Pain Questionnaire was difficult to complete because of its use of unfamiliar words such as "lancinating." The Work Family Conflict Scale was not useful because many

TABLE 4.
Linear Regression Analysis for Beck Depression Inventory and Hours of Unscheduled Absence

Variable	B	SE B	β
(Intercept)	−4.043	6.050	
Beck Depression Inventory score at baseline	1.351	0.512	0.576

Note: $R^2 = 0.332$. Significance of overall regression $p < .05$ (.019). B = unstandardized regression coefficient; SE B = standard error of B; β = standardized regression coefficient.

questions referred to children, which caused 40% of participants to write in "N/A" or leave the items blank. Although completion rates were high, the Minnesota [Job] Satisfaction Questionnaire and State-Trait Anxiety Inventory showed no meaningful results. The Nordic Musculoskeletal Questionnaire was not sufficiently responsive to yield meaningful information on change during the study period because of four questions on symptoms in the past 12 months.

For the study's secondary aim, depression accounted for one-third of the variance in unscheduled hours absent because of back pain (Table 4). Interestingly, there was no significant correlation between VAS pain intensity and Beck Depression Inventory scores at baseline, nor did VAS pain intensity scores account for any significant variance in hours absent. Although the intervention group had fewer hours of unscheduled absences (Table 5), the difference was not statistically significant ($p > .05$) because of the small sample size. However, these results did indicate a large effect size.

LIMITATIONS

The sample size was too small to provide significance in statistical tests. The sessions were offered sequentially, not concurrently, introducing the threat of history. Different psychologists led each of the groups, reducing standardization of the intervention. The study was insufficiently funded to provide redundant sessions on different days of the week to accommodate the varying schedules of direct patient care providers. Requiring completion of 14 instruments may have been a participant burden.

DISCUSSION

The high dropout rate in the intervention group, coupled with the increase in stress scores in that group, indicate that these participants either found attending a session at a specific time and day of the week difficult or they judged the intervention not helpful. The lack of significant differences between the groups on the majority of measures may have been a result of the study's short duration or shortened time for delivery of the CBT intervention. The effect of using different group leaders is unknown.

The sample size was too small to detect differences in most outcome measures. However, effect sizes for depression (Beck Depression Inventory) and pain intensity (VAS) lead us to conclude that further studies of these measures might be worthwhile.

The significant relationship between depression and work absence highlights the importance of psychosocial factors in disability. The size of this relationship was large (33% variance), and although it is assumed that the depression was related to, or the result of, the pain condition, we cannot rule out other potential sources of this psychologic distress with our study design. These results suggest that work absence might be reduced with successful treatment of either pain or depression or both. The efficacy of CBT for the treatment of both chronic pain and depression has been well established (Craighead & Craighead, 2001; Wells-Federman, Arnstein, & Caudill, 2002).

CONCLUSIONS AND RECOMMENDATIONS

Although back pain is prevalent in direct patient care providers, researchers face challenges intervening with RNs and NAs before their pain and disability get so severe that they report a work-related injury or progress to chronic pain. Primary prevention activities involving modifying the workplace with lifting equipment will assist in reducing the incidence of back pain. However, such equipment has an unknown effect on the large percentage of this workforce already experiencing pain. Given that acute pain often transitions into chronic pain, a cognitive-behavioral intervention

TABLE 5.
Hours of Unscheduled Absences Resulting from Back Pain by Group

Group	N	Mean hours (SD)	SEM
Intervention	7	2.29 (6.05)	2.29
Control	9	14.00 (20.83)	6.94

$t(14) = -1.43$, $p = .174$ (two-tailed), $d = .9$. *SD,* Standard deviation; *SEM,* Standard error of mean.

delivered early in disease pathogenesis shows promise in helping direct patient care providers reduce back pain and perhaps negative mood and work absence. We propose to study this further in work settings where the physical risk factors from patient handling have been controlled through ergonomic interventions. To improve participant retention in the intervention group in future studies, sessions should be offered more frequently, allowing for a choice of times and days. A sample size of 35 to 45 participants per group is needed to show a reliable effect in VAS Pain Intensity. The length of the intervention should be restored to 9 weeks with booster sessions, which has been successful for patients with chronic pain at the University of Florida's Spine Center and Psychology Clinic. The follow-up period should be longer (at least 1 year) to assess longer-term effectiveness of CBT. It would also be useful to examine multiple sources of affective distress to aid in treatment planning or other interventions and to better understand the causal links among pain, negative affect, and work absence/disability (Okun et al., 1996; Stanley et al., 1996).

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