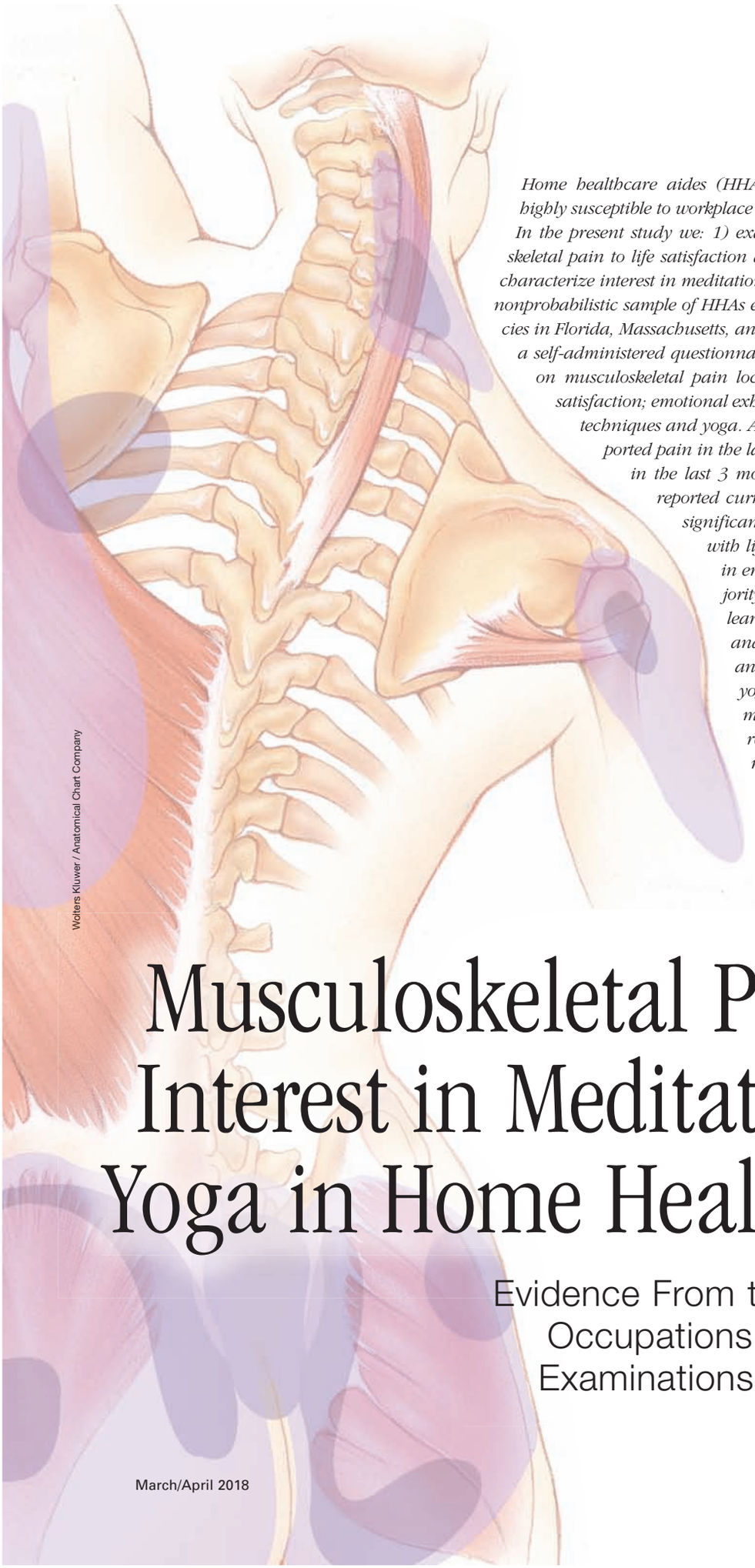

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Home healthcare aides (HHAs) are a growing U.S. workforce highly susceptible to workplace stressors and musculoskeletal pain. In the present study we: 1) examine the association of musculoskeletal pain to life satisfaction and emotional exhaustion; and 2) characterize interest in meditation and yoga in a sample of HHAs. A nonprobabilistic sample of HHAs employed at home healthcare agencies in Florida, Massachusetts, and Oregon (n = 285 total) completed a self-administered questionnaire with standard survey measures on musculoskeletal pain location, duration, and severity; life satisfaction; emotional exhaustion; and interest in meditation techniques and yoga. Among HHAs responding, 48.4% reported pain in the last 7 days and 46.6% reported pain in the last 3 months. Home healthcare aides who reported current pain and chronic pain had a significant ($P < .05$) decrease in satisfaction with life score and a significant increase in emotional exhaustion score. The majority of HHAs reported an interest in learning about the benefits (65.6%) and practice (66.4%) of meditation and a willingness to participate in a yoga class (59.2%) or stress management meeting (59.1%). The HHAs reported both acute and chronic musculoskeletal pain that was correlated with lower life satisfaction and greater emotional exhaustion. More efforts are needed to reduce the sources of injury and emotional exhaustion.

Musculoskeletal Pain and Interest in Meditation and Yoga in Home Health Aides

Evidence From the Home Health Occupations Musculoskeletal Examinations (HHOME) Study

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In 2015, the U.S. Bureau of Labor Statistics (2016) reported 820,630 home healthcare aides (HHAs) were employed in the U.S. workforce—an estimate that is projected to rise due to the aging population (Bercovitz et al., 2011). Home healthcare aides work in a home or assisted living facility and perform a variety of tasks, including dressing wounds, bathing, preparing meals, and dressing and grooming patients. These workers are ranked among the highest for workplace injuries (McCaughey et al., 2012). According to the U.S. Bureau of Labor Statistics, nursing assistants were second to construction laborers and freight, stock, and materials movers for the highest rates of musculoskeletal disorders in the United States. The effects of this higher rate of musculoskeletal injury on life satisfaction and emotional exhaustion in HHAs have not previously been assessed.

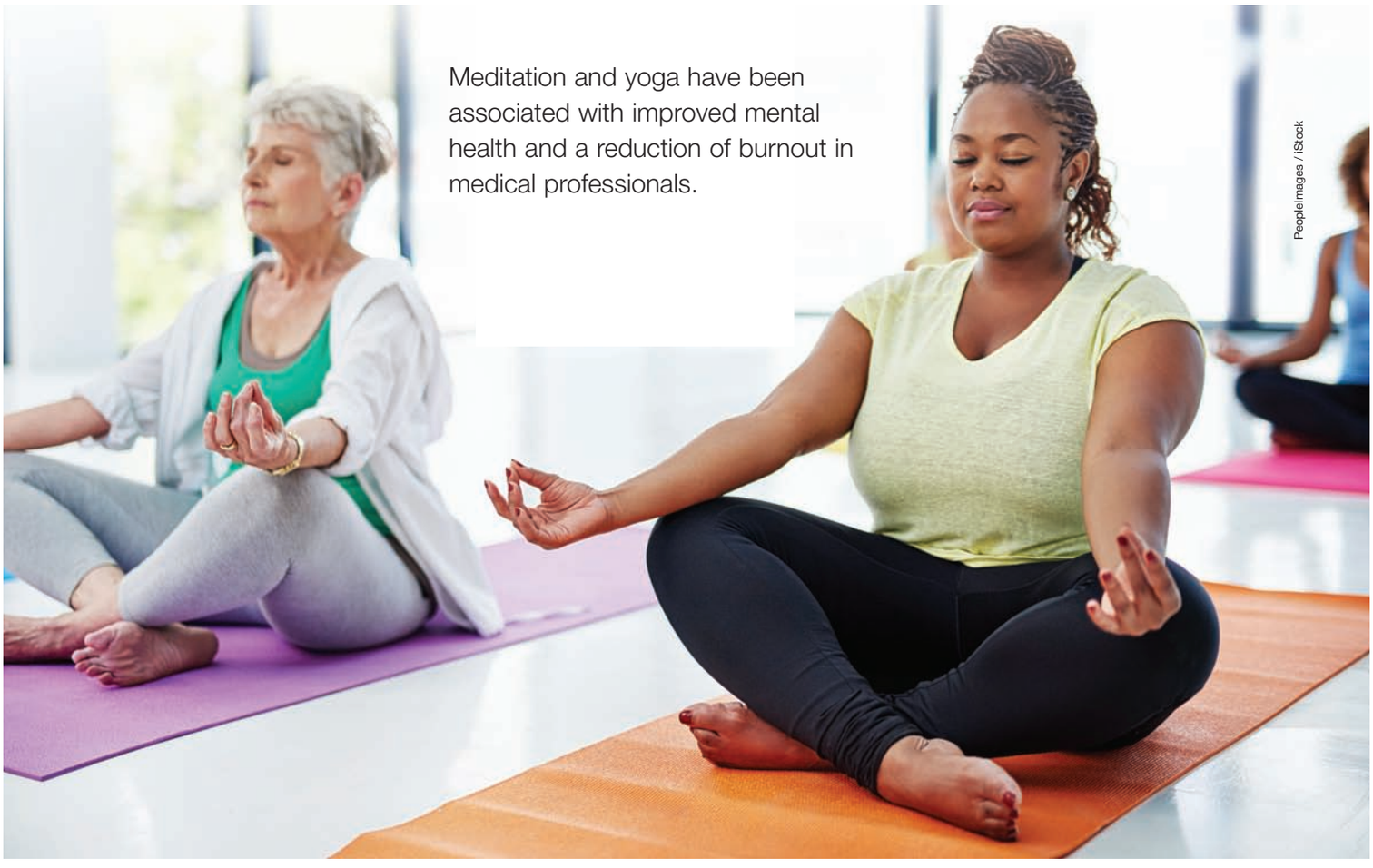
Unpredictable working conditions, such as household furniture orientation, confined spaces, heavy lifting, varying levels of patient physical disability, and smoking behaviors particularly in a patient's home, put HHAs at risk for falling and exposing themselves to a variety of environment hazards (Gershon et al., 2008; Markkanen et al., 2014; Palesy, 2016; Polivka et al., 2015; Quinn et al., 2016). Home healthcare aides may also encounter icy driveways, animals, loaded firearms or weapons, violence in or around the home, exposure to dangerous home visitors, and verbal and physical abuse by patients (Galinsky et al., 2010; Markkanen et al.). They are particularly at risk for back, knee, and shoulder pain acquired while moving patients or other items (Bell et al., 2008; Wipfli et al., 2012). Some HHA duties such as pushing wheelchairs, aiding with showering and toileting, and transferring bed-bound patients require bending, lifting, pushing, and pulling—actions that are associated with work-related musculoskeletal injuries (Choi & Brings, 2015; Markkanen et al.). Trinkoff et al. (2003) found that musculoskeletal injuries were less likely when mechanical lifting devices and lifting teams were available, which may not be present in the home. Furthermore, a review article by Bell et al. highlighted several studies funded by the National Institute for Occupational Safety and Health that demonstrated the benefit of safe lifting programs on back injury, a specific type of musculoskeletal pain. Musculoskeletal disorders are a major occupational hazard for HHAs and it is important to characterize how they are impacted by worksite exposures and worker stress.

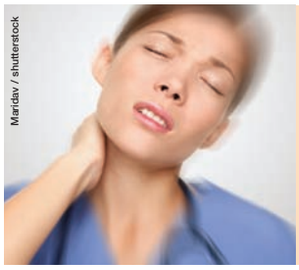
In 2015, the musculoskeletal disorder incidence rate of nursing assistants (a comparable work group to HHAs) was 171 cases per 10,000 full-time workers, compared with 94 cases for heavy and tractor-trailer truck drivers (U.S. Bureau of Labor Statistics, 2016). In 2007, the annual prevalence of back injuries among HHAs was 5.2% (Arlinghaus et al., 2013). Improper training on safe patient handling may contribute to high injury rates (Palesy, 2016). Additionally, low socioeconomic status as evidenced by household income and educational attainment has been correlated to workplace safety and health, suggesting that HHAs may be at increased risk for musculoskeletal injuries. More specifically, a 2011 report by the U.S. National Center for Health Statistics reported that 70% of the HHA workforce is employed at independent agencies that are not part of a chain of agencies, 77.3% have at least a high school diploma, 53.3% were white, 56.5% were aged 35 years and over, and 46.9% had a family income of $30,000 or less (Bercovitz et al., 2011). Given that HHAs are often in a low socioeconomic category and they are required to work in hazardous contexts, research needs to examine what might alleviate the negative health outcomes.

In addition to being exposed to factors that may increase physical harm, HHA workers are placed under significant emotional stress. As with all healthcare workers, HHAs must cope with ill and dying, aggressive, abusive, and uncooperative patients. Moreover, many suffer from universal healthcare issues such as time constraints and pressure due to the burden to see more patients in a shorter amount of time (Galinsky et al., 2010). Additional organizational-level stressors specific to the home healthcare workforce identified by National Institute for Occupational Safety and Health scientists include working unsupervised, working alone, traveling through dangerous neighborhoods, sitting in traffic, and dealing with familial disputes placing HHAs at risk for stress-related complications.

The possibility of developing chronic pain and the high degree of emotional stress placed on HHAs (Van De Weerdt & Baratta, 2012) is expected to decrease life satisfaction and increase emotional exhaustion in this workforce. Research has demonstrated that life satisfaction (i.e., a positive evaluation of one's life; positive emotions) (Diener et al., 1985) is key to higher levels of job satisfaction and performance (Judge & Bono, 2001). Moreover, it is negatively associated with emotional exhaustion (Hülsheger et al., 2013). Emotional exhaustion, feeling tired and fatigued due to emotional strains can be detrimental to one's mental and physical health (Maslach et al., 1997, p. 205). To fully understand the impact of chronic pain is to identify and then mitigate work factors that lead to emotional exhaustion and lower levels of life satisfaction. Meditation and yoga may offer a solution to these workers.

Meditation and yoga have been associated with improved mental health and a reduction of burnout in medical professionals (Amutio et al., 2015; Goodman & Schorling, 2012; Kemper & Khirallah, 2015; Mackenzie et al., 2006). Pain management has also been reported as a condition for meditation-based practices (la Cour & Petersen, 2015; Zeidan et al., 2012). Yoga is considered a method in which there is a strong interaction between the mind and body in order to promote, support, and increase health and well-being over the course of one's life (Fishbein & Saper, 2014). Mindfulness meditation, more specifically, is defined as a method of training one's mind to be present, in-the-moment (Kerr et al., 2013). A number of studies have demonstrated the effectiveness of mindfulness-based therapies in improving mental health and well-being and reducing anxiety, stress, and depression (Botha et al., 2015; Hofmann et al., 2010). In a 1-year study, Amutio et al. found that through mindfulness training they could significantly increase positive emotional states and increase relaxation. Healthcare professionals including medical students, physicians, and nurses have all been targeted by researchers




Maridav / shutterstock

Strategies to reduce musculoskeletal pain in the highly susceptible home healthcare aide workforce are needed to improve life satisfaction and reduce emotional exhaustion.

for mindfulness-based practices due to their high levels of stress, anxiety, and burnout (Amutio et al.; Foureur et al., 2013). Yet, despite occupation-related physical demands and increased risk of psychosocial hazards, HHAs have not received attention as a group that could benefit from mental health and stress reduction strategies. Mindfulness and yoga may provide improved psychological health and physical relief from pain for HHAs.

The purpose of this study was to examine the association between musculoskeletal pain and HHA life satisfaction and emotional exhaustion. We also sought to estimate respondents' willingness to participate in meditation and yoga classes if such a program were available.

Methods

Study Design

We utilized a cross-sectional study to administer a one-time survey instrument that was developed using an exploratory sequential mixed-methods design. The survey instrument was designed with the objective of measuring among HHAs topics on workplace exposures, organization of work, and musculoskeletal pain. Over the course of 10 months in 2014, we conducted three focus group sessions using a structured script with a total of 32 HHAs to collect formative data for the Home Health Occupations Musculoskeletal Examinations (HHOME) survey instrument. Following the design, layout, and language translation (i.e., English and Spanish) of our survey instrument, we administered the final questionnaire to 285 HHAs located in Massachusetts (48.4%, n = 138), Florida (37.5%, n = 107), and Oregon (14.0%, n = 40). The survey data collection period occurred from March 2014 to February 2016.

Participant Recruitment

Home healthcare agencies operating in Massachusetts, Florida, and Oregon with established research partnerships with the investigators were contacted about the HHOME pilot study. Flyers recruiting HHAs to complete the anonymous language-sensitive (i.e., English or Spanish) survey instrument were distributed by research members in person at agency-scheduled HHA educational sessions or over an email and postal mail distribution list provided by the agencies. A $20 gift card was provided to study participants. A total of 285 HHAs were recruited and enrolled in the HHOME pilot study.

Survey Instrument

We developed a 55-item questionnaire organized into 10 sections. In the present study, we analyzed survey data based on questions assessing musculoskeletal pain, job- and sociodemographic characteristics, life satisfaction, emotional exhaustion, and yoga and meditation interest.

Musculoskeletal Questions. The musculoskeletal-related questions were selected from the validated Nordic musculoskeletal questionnaire that asked respondents: "During the last 7 days and separately, the last 3 months, have you had pain or aching in any of the areas shown on the body diagram?" with response options: lower back, shoulder, wrist, knee, neck, and ankles (Kuorinka et al., 1987). Our case definition for musculoskeletal pain included any respondent who responded in the affirmative to the question about having regular pain in an anatomic body region in the past 7 days and in the last 3 months. An average acute pain score and average chronic pain score were calculated by summing selected questions from the Nordic musculoskeletal questionnaire and dividing by the number of questions. Questions were on a 10-point Likert scale with 0 signifying "no pain" and 10 characterizing "pain as bad as you can imagine."

Socio- and job demographics. Sociodemographic and job characteristic questions used to

Table 1. Sociodemographic and Job Characteristics Among Home Healthcare Aides Participating in the HHOME Study, *n* = 285

Characteristics	*N** (SD)
Age, mean	40.8 (13.8)
Gender, *N* (%)	
Female	268 (94.4)
Male	16 (5.6)
Race/ethnicity, *N* (%)	
White, non-Hispanic	179 (63.9)
American Indian or Alaskan native	4 (1.4)
Black or African American, non-Hispanic	12 (4.3)
Hispanic or Latino/a	85 (30.4)
Relationship status, *N* (%)	
Married	91 (34.2)
Divorced	49 (18.4)
Widowed	4 (1.5)
Separated	5 (1.9)
Never married	91 (34.2)
Member of an unmarried couple	26 (9.8)
Education, *N* (%)	
Grades 9–11 (Some high school)	6 (2.1)
Grade 12 or GED (High school graduate)	115 (41.1)
Some college or technical school	101 (36.1)
College graduate	55 (19.6)
Master's degree or higher	3 (1.1)
Household income, *N* (%)	
Less than $19,999	45 (17.5)
$20,000–$29,999	109 (42.4)
$30,000–$39,999	68 (26.5)
More than $40,000	35 (13.6)
Work experience	
Years worked as home healthcare aide, **mean (SD)**	12 (10.1)
Hours worked in typical work week, **mean (SD)**	33 (10.7)
Weekend shifts per month, **mean (SD)**	2 (2.1)
Home healthcare aide is primary job, ***N* (%)**	242 (86.7)
Has second job outside agency, ***N* (%)**	88 (32.5)
State, *N* (%)	
MA	138 (48.4)
FL	107 (37.5)
OR	40 (14.0)
Language, *N* (%)	
English	179 (62.8)
Spanish	106 (37.2)

*Differences in subtotal population sample due to item nonresponse or missing.

capture data in Table 1 were adapted from the National Home Health Aide Survey (National Home Health Aide Survey, 2007). Any deviations from the National Home Health Aide Survey were made for clarification purposes and after taking into consideration feedback from focus groups. For instance, the grouping of household income was modified from "$20,000 to under $30,000" to "$20,000- $29,000" to avoid any possible confusion among respondents. The variable, "ability to get along on income," included the following answer choices: 1) "we can't make ends meet," 2) "we have just enough, no more," 3) "we have enough, with a little extra sometimes," and 4) "we always have money left over."

Life Satisfaction. The validated Satisfaction with Life Scale was used to assess life satisfaction (Diener et al., 1985). Participants were asked to rate five items on a 7-point Likert-type scale. The rating scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). A satisfaction with life (SWL) score was calculated using the sum of the scale's five items. Participants were asked questions such as "in most ways my life is close to my ideal" and "the conditions of my life are excellent." Benchmark values for this scale include the following: 31–35 = *extremely satisfied*, 26–30 = *satisfied*, 21–25 = *slightly satisfied*, 20 = *neutral*, 15–19 = *slightly dissatisfied*, 10–14 = *dissatisfied*, 5–9 = *extremely dissatisfied*. Cronbach's alpha internal consistency coefficient was 0.89.

Emotional Exhaustion. A four-item emotional exhaustion score was calculated by obtaining the sum of the four items of the emotional exhaustion subscale from the Maslach Burnout Inventory (Maslach et al., 1997). Participants were asked to rate their feelings of emotional exhaustion such as "I feel emotionally drained from my work" on a 1 to 7 rating scale with 1 = *never* and 7 = *every day*. This variable also has very high internal consistency, α = .92. The scoring for the Maslach Burnout Inventory is coded by the following parameters: 0–16 = *low*, 17–26 = *moderate*, and 27+ = *high*.

Yoga and Meditation. Survey items on yoga and meditation interest were adapted from the 2012 National Health Interview Survey measures on meditation and yoga. The survey instrument was designed and validated in both English and Spanish by the National Center for Health Statistics for use by the general U.S. population (National Center for Health Statistics, National Health Interview Survey, 2012). We adapted these

Table 2. Average Satisfaction With Life and Emotional Exhaustion Scores Among Home Healthcare Aides Participating in the HHOME Study, $n = 285$

	Life-Satisfaction	Emotional Exhaustion
	Mean Satisfaction With Life Score (SD)	Mean Emotional Exhaustion Score (SD)
Total sample	20.9 (7.9)	12.9 (7.3)
Current pain (last 7 days)		
Yes	20.1 (7.3)*	15.8 (6.9)*
No	22.6 (7.9)	10.4 (6.3)
Chronic pain (last 3 months)		
Yes	18.6 (7.5)*	16.7 (6.9)*
No	22.2 (8.1)	9.5 (6.1)

*$p < .05$ as determined by independent t-test

measures for HHAs and evaluated the reliability and validity of yoga and meditation questions using three focus groups made up of 32 HHAs. Sample items include, "Do you have previous experience with any type of meditation?" and "Would you be willing to participate in gentle yoga or stretching?"

Power Analysis. Although this pilot study was originally powered (i.e., power analysis estimated 250 HHAs needed) to detect a one-unit difference in pain measure response scores, including nonresponse between Hispanic and non-Hispanic HHAs, we recruited and enrolled a total of 285 HHAs (response rate = 98.6% or 285/289). Additionally, a post hoc power analysis was conducted using G*Power. Results indicated that with an alpha set at .05 and an effect size of .15, a sample of 285 participants had more than adequate power to detect moderate to large effect sizes (power* .82).

Data Analysis

Frequency and descriptive statistics were calculated for all study variables. Worker age, a continuous variable, was expressed as mean ± the standard deviation of the mean, whereas categorical variables were expressed as frequency and percent. Total SWL scores and emotional exhaustion scores of HHAs with musculoskeletal pain were compared with those who did not have pain using the independent sample t-test. The association of average acute and chronic pain to life satisfaction and emotional exhaustion in HHAs with musculoskeletal pain were compared using linear regression. Pearson correlations were used to determine which variables to include in linear regression models. Variables that were significantly correlated ($p < .05$) were chosen. Despite a nonsignificant Pearson correlation, age was added to the linear regression model predicting life satisfaction because it is a well-known modifier of SWL. The linear regression models predicting the life satisfaction score in HHAs with acute pain and chronic pain controlled for ability to get along on income, gender, relationship status, income, and weekly work hours. The linear regression models predicting the emotional exhaustion score in HHAs with acute and chronic pain controlled for ability to get along on income, age, and race. All analyses were conducted using the Statistical Package for the Social Sciences (IBM SPSS Statistics for Mac, Version 22.0, Armonk, NY). The university's Institutional Review Board (IRB) approved the research protocol for this pilot study (IRB#13-2798).

Results

Sample Descriptive Statistics

Our sample of 285 HHAs was predominately female (94%) with a mean age of 40.8 (± Standard Deviation [SD], 13.8). Survey participants identified predominately as white (63.9%), Hispanic ethnicity (30.4%), and most completed the questions in English (62.8%), with some participants completing the survey in Spanish (37.2%; *see* Table 1). Most HHAs were either married (34.2%) or never married (34.2%). Nineteen percent graduated from college and the average household income was less than $40,000 for most workers (less than $19,999 [17.5%], $20,000–$29,999 [42.4%], $30,000–$39,999 [26.5%]). The average number of years and hours worked in a typical week as an HHA was 12 years and 33 hours, respectively. Average commute time per day of work was 31.2 minutes with a range from 0 to 6.5 hours. The majority of respondents considered being a HHA as their primary job (86.7%). Among all survey respondents, 48.4% ($n = 118$) reported musculoskeletal pain within the last 7 days and 46.6% ($n = 116$) reported pain within the last 3 months. Pain was most frequently reported in the lower back (41.4% acute, 35.4% chronic), left shoulder (30.5% acute, 22.5% chronic), and neck (24.6% acute, 20.0% chronic). Average level of pain was 4.6/10.0 acutely and 5.2/10.0 chronically.

Average Life Satisfaction and Emotional Exhaustion Score

On average, HHAs reported a sum SWL score of 20.9 (*SD* = 7.9), which is categorized as *slightly satisfied*. The average emotional exhaustion score for HHAs was 12.89 (*SD* = 7.29), falling into the *low* category for emotional exhaustion (Table 2). When examining the impact of pain (in the past 7 days) compared to those with no pain on life satisfaction results revealed that there were significant differences between those with and without pain on SWL ratings (t[242] = 2.5, $p < .013$, 95% CI [0.5, 4.4]). Those who did not experience pain had an SWL rating of $M = 22.6$, $SD = 7.9$ compared with those who experienced pain, $M = 20.1$, $SD = 7.3$.

Table 3. Pearson Correlations of Acute and Chronic Musculoskeletal Pain to Life Satisfaction and Emotional Exhaustion Among Home Healthcare Aides Participating in the HHOME Study, $n = 285$

	Satisfaction With Life Score	Emotional Exhaustion Score
Current pain (last 7 days)	-0.47*	0.16
Chronic pain (last 3 months)	-0.54*	0.26*

*$p < 0.01$

Similarly, we found those who reported having chronic pain (pain in the last 3 months) had a statistically significant difference in emotional exhaustion compared with those without current pain (t[244] = -8.7, $p < .000$, 95% CI [-8.8, -5.6]). Those who did not experience pain reported an emotional exhaustion rating of $M = 9.5$, $SD = 6.1$ compared with those who experienced pain, $M = 16.7$, $SD = 6.9$.

Musculoskeletal Pain to Life Satisfaction and Emotional Exhaustion Correlations

Before running the analyses, we estimated the Pearson correlations of acute and chronic musculoskeletal pain to life satisfaction and emotional exhaustion (Table 3).

Regression Analyses

Next we conducted analyses using hierarchical linear regression to examine whether acute pain levels and chronic pain would predict lower levels of life satisfaction. Comparing chronic pain scores with emotional exhaustion scores found a statistically significant relationship between chronic pain scores and emotional exhaustion scores (unstandardized B 0.83, unadjusted R squared 0.07, SE 0.31, $p < .009$). However, when comparing acute pain scores with emotional exhaustion scores,

Table 4. Linear Regression Models Predicting Life Satisfaction and Emotional Exhaustion in Home Healthcare Aides With Acute and Chronic Pain Participating in the HHOME study, $n = 285$

	Life Satisfaction Score				Emotional Exhaustion Score			
Characteristic	Adjusted B	Adjusted R squared	SE	*P*-value	Adjusted B	Adjusted R squared	SE	*P*-value
Acute pain (last 7 days)	-2.13*	0.60	0.31	.000	1.10*	0.15	0.40	.007
Ability to get along on income	3.69*		0.78	.000	0.08		1.05	.940
Gender	-3.44		1.85	.067				
Relationship status	-1.17*		0.32	.000				
Income	1.43*		0.68	.038				
Weekly work hours	0.00		0.07	.955				
Age	-0.08		.057	.166	-0.03		0.06	.541
Race					-1.21*		0.30	.000
Chronic pain (last 3 months)	-1.70*	0.59	0.26	.000	0.84*	0.16	0.31	.009
Ability to get along on income	2.18*		0.90	.018	0.70		0.99	.485
Gender	-6.40*		2.44	.011				
Relationship status	-1.28*		0.33	.000				
Income	1.80*		0.80	.027				
Weekly work hours	-0.03		0.07	.708				
Age	-0.06		0.06	0.247	-0.03		0.05	.513
Race					-1.00*		0.27	.000

*$p < .05$

Table 5. Meditation, Yoga, and Stress Management Among Home Healthcare Aides Participating in the HHOME Study, *n* = 285

Interest and Experience Responses	*N* (%)
Very to somewhat willing to participate in gentle yoga or stretching	154 (59.2)
Previous experience with any type of meditation	105 (40.1)
Friends or family members who practice meditation	98 (37.4)
Willing to learn more about the benefits of meditation for managing stress	172 (65.6)
Interested in learning how to practice meditation and/or stress reduction techniques	170 (66.4)
Willing to attend free weekly group meetings and practice at home in order to learn how to better manage stress and overall well-being	153 (59.1)

there was no significant relationship (unstandardized B 0.65, unadjusted R squared 0.03, SE 0.39, $p = .099$).

After controlling for ability to get along on age, income, gender, relationship status, and weekly work hours, those with current pain still demonstrated a statistically significant ($p < .05$) decrease in SWL score (adjusted B -2.13, SE 0.31) as did those with chronic pain (adjusted B -1.70, SE 0.26) (Table 4). Similarly, after controlling for ability to get along on income, age, and race, those with chronic pain continued to have a statistically significant increase in the mean emotional exhaustion score ($p < .05$) compared with those without pain (adjusted B 0.84, SE 0.31). Controlling for ability to get along on income, age, and gender made the relationship between acute pain score and the emotional exhaustion score significant (adjusted B 1.10, SE 0.40, $p = .007$).

Meditation and Yoga Class Estimates

The majority (59.9%) of HHAs did not report previous experience with any type of meditation or having any family members with experience (62.6%; Table 5). Of all the participants, 59.2% stated they are willing to participate in gentle yoga or stretching, 65.6% are willing to learn more about the benefits of meditation for managing stress, 66.4% are interested in learning how to practice meditation and/or stress reduction techniques, and 59.1% are willing to attend free weekly group meetings and practice at home to learn how to better manage stress and overall well-being.

Discussion

The overarching goal of this study was to understand the impact of chronic and acute pain on life satisfaction and emotional exhaustion among HHAs. In our study, greater chronic pain scores were associated with a statistically significant decrease in the SWL score and an increase in the emotional exhaustion score. This is important because when it comes to ability to work (Blyth et al., 2003; Miranda et al., 2010) and positive mental health (Scott et al., 2016), research has found that chronic pain is detrimental. These findings raise concern for the HHA workforce given their job is to take care of others. If they cannot get to work or physically and mentally feel exhausted, it can increase negative health outcomes.

Life satisfaction as measured by the Lisat-9 survey instrument has been studied in patients with chronic musculoskeletal pain (Boonstra et al., 2013), but this is the first study to use the Life Satisfaction Scale in HHAs with musculoskeletal pain. Similarly, burnout, a measure that encompasses emotional exhaustion, has previously been shown to increase musculoskeletal pain in healthy employees (Armon et al., 2010), but no such investigation has been performed specifically in HHAs, despite their high rate of workplace injuries. Strategies to reduce musculoskeletal pain in the highly susceptible HHA workforce are needed to improve life satisfaction and reduce emotional exhaustion.

Home healthcare aides in our sample reported 7-day (48.4%) and 3-month (46.6%) pain. This pain may be due to high physical demands placed on HHAs who must move patients, often without the proper equipment (Arlinghaus et al., 2013). A recent study looking at occupational risk factors of HHAs found that musculoskeletal strain was one of the most frequently reported hazards (Quinn et al., 2016). Low back, left shoulder, and neck pain were among the highest regions affected in our sample. This finding is consistent with other studies examining regions of the body most affected by the physical stress of working in a home healthcare setting (Alperovitch-Najenson et al., 2015; Davis & Kotowski, 2015). Heavy and improper lifting (Bell et al., 2008; Palesy, 2016) during patient-care tasks has been identified as sources of musculoskeletal pain. An important step in

According to the U.S. Bureau of Labor Statistics (2016), nursing assistants were second to construction laborers and freight, stock, and materials movers for the highest rates of musculoskeletal disorders in the United States.

preventing injury is to supply HHAs with the necessary equipment to help move patients and objects within the home (Bell et al.). Additionally, teaching HHAs how to adjust their bodies while performing work-related tasks using ergonomics may be a promising approach to preventing injuries in HHAs (Arlinghaus et al.). To help those workers who, despite prevention efforts, continue to experience work-related musculoskeletal pain, mindfulness-based practices—which have been shown to reduce chronic pain—may offer a reduction in pain intensity and pain-related distress (Henriksson et al., 2016; la Cour & Petersen, 2015).

A recent study conducted by Henriksson et al. (2016) demonstrated that an 8-week web-based mindfulness training helped to reduce pain intensity and pain-related suffering while improving life satisfaction in a group of individuals with chronic pain. Furthermore, research by Hittle et al. (2016) called for the implementation of health promotion programs in home healthcare workers. A yoga or meditation practice might be considered as an appropriate intervention in HHAs because of their efficacy in producing psychological improvements and pain modulation (Amutio et al., 2015; Goodman & Schorling, 2012; Kemper & Khirallah, 2015; la Cour & Petersen, 2015; Mackenzie et al., 2006; Zeidan et al., 2012). Prior to initiating such an intervention, however, it is important to assess whether this workforce would be interested and willing to participate. In our study, willingness to participate in meditation, yoga, and stress management training was determined via four survey items. All four questions showed that our sample of HHAs is willing and interested in meditation, yoga, and/or stress reduction training. Future studies may further investigate why HHAs feel they would benefit from such training.

We have demonstrated that HHAs are exposed to significant physical and emotional stress in the workplace. To prevent workplace injury, HHAs may be provided with appropriate moving machinery and training sessions for safe patient handling. A study by Palesy (2016) identified the importance of training HHAs to modify the patient's home environment (e.g., removing obstacles, caging pets) to create a safer workspace, obtain guidance from patients who are familiar with proper execution of care tasks, and interpersonal communication between patients and aides specific to handling tasks. We did not characterize training issues in our study, but would be advised to investigate the impact administrative support and work-related instruction have on the mental health of HHAs in future studies.

This study is not without limitations, including the use of a cross-sectional study design. Without temporality, no causal relationship can be made and it is difficult to assess if a worker's tenure as an HHA contributes to greater pain severity, pain locations, decreased quality of life, or if those who report greater emotional exhaustion and less satisfaction are more likely to have pain. Also, the variable average chronic pain score was calculated using three instead of four questions assessing chronic pain in the Nordic musculoskeletal questionnaire because one question was mistakenly not included in the questionnaire. Furthermore, work factors such as work hours, work structure and management, and participation in work-related decision making all affect life satisfaction and emotional exhaustion (Demerouti et al., 2000). Despite our attempt to control for these variables in our models, we could not capture all work-related factors. Perhaps the greatest limitation of our study was our use of a nonprobability sample. Home healthcare agencies were selected based on existing partnerships established with investigators rather than through random selection. This risks creating a sample which is not nationally representative of HHAs. Furthermore, a self-reported survey is prone to recall bias and misreporting due to natural symptom overestimation and fallacy of memory (Van den Bergh & Walentynowicz, 2016).

These potential errors are likely to generate nondifferential misclassification because all groups are subject to the same probability of being misclassified. In addition, as this study is investigating human interests—which can be modified—the generalizability of the findings describing meditation and yoga interest in HHAs is limited. Future investigations assessing the impact of HHA work on acute and chronic pain should be designed longitudinally and with objective measures.

Despite these limitations, our study has several strengths of design. Our study included a large, diverse sample size with participants chosen from three locations throughout the country: Florida, Massachusetts, and Oregon. This type of sampling helps to improve the generalizability of our results. Furthermore, with three different forms of survey delivery (i.e., web, postal mail, or in-person), we were able to provide an exceptional response rate of 98.6%. Finally, we chose standardized outcome measures for musculoskeletal pain location, duration, and severity; life satisfaction; and emotional exhaustion. Using survey instruments that have been evaluated by other institutions helps to ensure the validity of the measures.

Conclusion

This study investigated the association between acute and chronic musculoskeletal pain and life satisfaction and emotional exhaustion in the high-risk HHA workforce. In this study sample of HHAs, we also characterized interest in meditation and yoga—interventions that may improve our target measures. Home healthcare aides are at risk for musculoskeletal pain due to the physically demanding requirements of the profession and emotional stress due to both the nature of working in the healthcare profession as well as the unique characteristics of working in a patient's home. The first effort should be at instituting measures to reduce sources of these injuries and stress. In addition, by introducing meditation or yoga to this vulnerable population, measures of acute and chronic pain—which this study has demonstrated to be associated with decreased life satisfaction and increased emotional exhaustion—may improve ("2007 National Home Health Aide Survey," 2007). ☗

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