

# Stressors Among Latino Day Laborers

## A Pilot Study Examining Allostatic Load

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### RESEARCH ABSTRACT

This pilot study evaluated the feasibility of conducting a research project focused on stressors and allostatic load (AL) among day laborers. A total of 30 Latino men were recruited from CASA Latina, a worker center in Seattle. Participants completed an interview and researchers measured six indicators of AL (body mass index, waist-to-hip ratio, systolic blood pressure, diastolic blood pressure, C-reactive protein, and cortisol). Percentages and mean scores were calculated for several self-reported stressors in work, economic, and social contexts and were compared between low and high AL groups. Overall, participants with high AL reported experiencing more stressors than those with low AL. Additionally, those with high AL generally reported being less healthy both physically and mentally. Findings suggest that Latino day laborers experience stressors that place them at risk for high AL. Also, a study of this nature is possible, but must be conducted with trust and collaboration between researchers and community partners.

Occupational health risks for immigrant day laborers have received increasing attention in recent years (Buchanan, 2004; Cummings & Kreiss, 2008; Pransky et al., 2002; Seixas, Blecker, Camp, & Neitzel, 2008). Day labor is defined as temporary, informal work arrangements with employers lasting for short periods, typically one day at a time. Working on this contingent basis, day laborers are precariously employed and face job insecurity, low income, limited benefits and protections, and increased social and economic vulnerability (Benach & Muntaner, 2007; Tompa, Scott-Marshall, Dolinschi, Trevithick, & Bhattacharyya, 2007). Further,

day labor is commonly associated with work involving high-risk job activities (e.g., construction, painting, landscaping, fishing, household moving, home renovation, warehousing, janitorial and cleaning work, and manufacturing) that can have serious work-related injury and illness consequences (Pransky et al., 2002; Valenzuela, 1999). These jobs involve a variety of hazards (e.g., dangerous mechanized tools and equipment, high noise levels, falls from height, and exposure to chemicals and dust) and often lack appropriate controls, including the absence of personal protective equipment (PPE). Further, job opportunities (albeit temporary) for day laborers may fluctuate based on demand and season, resulting in extended periods of unemployment.

Latino immigrants are a significant portion of the day labor work force and are increasingly hired for the most hazardous jobs (Baron & Dorsey, 2006; LaVeist, 2005; Ochsner et al., 2008; Seixas et al., 2008; Walter, Bourgois, Margarita Loinaz, & Schillinger, 2002), due in part to their marginalized social and immigration status. For example, the majority of day laborers may be undocumented immigrants (Valenzuela & Theodore, 2006) who

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## Applying Research to Practice

Day laborers can benefit from services that occupational health nurses provide, including training about injury prevention, as a way to help prevent more chronic effects of stress. Occupational health nurses can assume several roles, such as informing research questions, determining features of study design and protocol, participating in data collection, and crafting interventions based on research findings, in studies examining the effects of work-related stressors on health. As advocates for worker health, occupational health nurses can encourage and facilitate relationships between researchers and community-based organizations serving marginalized work forces. Using an ecological perspective, occupational health nurses should consider how factors external to the immediate work environment spanning the many layers of society impact the health of worker populations.

live in constant fear of deportation. Lack of documentation can provide supervisors and employers a means to control, exploit, and intimidate poor workers into accepting abusive circumstances (Martinez, 2006). As such, these workers are less likely to demand improved working conditions or to refuse hazardous work. Among immigrants, Latinos have repeatedly been shown to have an elevated risk of occupational injury and fatality, with injury and fatality rates nearly twice those of all workers (Loh & Richardson, 2004; Pransky et al., 2002). Injured immigrant Latino workers report little or no occupational safety and health training and often do not benefit from workers' compensation or other forms of insurance, an oft-cited challenge for precariously employed and contingent workers (Azaroff, Levenstein, & Wegman, 2004; Quinlan & Bohle, 2004; Quinlan & Mayhew, 1999; Welch, Dong, Carre, & Ringen, 2007).

Working in contingent, precarious jobs, living as a marginalized population, and having restricted means to improve social and economic status can be overwhelmingly stressful to Latino day laborers. For example, consistently working under conditions that pose the threat of injury or death can be highly stressful. Employment insecurity can also be a major stressor because of implications related to income shortages and lack of benefits (e.g., health insurance), which, in turn, lead to difficulties paying for food, housing, and health care services. Further, chronic unemployment may contribute to social isolation, loss of self-esteem, and unhealthy behaviors (Bartley, 1994). Walter et al. (2002) depict the sorts of stressful circumstances that day laborers typically encounter using an ecological perspective. The authors present a set of

layered social contexts (e.g., large-scale social forces, local street corner, workplace, family) that shape day laborers' lives and their experiences of work injury.

## ALLOSTATIC LOAD AND RELEVANCE TO DAY LABOR

Previous research has shown that stressful life and work experiences are harmful to health. Lazarus and Folkman (1984) characterized the "stressor-stress-strain" model as a process in which an event or a set of conditions (stressor) can elicit a physiologic response (stress) that may subsequently lead to a more chronic reaction (strain) should the stressor persist or the stress response go unrelieved. Environmental stressors and challenges can activate physiologic responses at multiple levels—from the cellular to the systemic. For example, under dangerous conditions, adrenalin is released, causing increased heart rate and blood pressure (i.e., "fight or flight" response). Chronic stress experiences can result in sustained elevations of multiple stress hormones (e.g., cortisol, epinephrine, norepinephrine) and, subsequently, disruption of normal functioning of various physiologic systems (e.g., cardiovascular, immune, endocrine, and nervous systems) (The John D. and Catherine T. McArthur Foundation, Research Network on Socioeconomic Status and Health, 1999).

McEwen (1998) and McEwen and Seeman (1999) developed the concept of allostatic load (AL) to characterize the physiologic effects of chronic stress. The idea of allostasis ("stability through change" or the active process of returning the body to homeostasis), introduced by Sterling and Eyre (1988), suggests that persistent activation of multiple physiologic responses returns the body to its "normal" state in reaction to environmental stressors. Over time, this process results in an accumulation and burden of "allostatic load." These dysregulations, even if minor, across multiple physiologic systems collectively have a "wear and tear" effect that ultimately leads to overall health risk and manifests in clinical conditions (Karlamañgla, Singer, McEwen, Rowe, & Seeman, 2002; McEwen, 1998; Seeman, Singer, Ryff, Dienberg Love, & Levy-Storms, 2002). As such, measuring markers of AL as a precursor to clinical indicators of disease provides insight into risk prior to clinical onset.

Conventionally, AL is a composite measure composed of multiple biological indicators. Seeman et al. (2004), Seeman, McEwen, Rowe, and Singer (2001), and Seeman et al. (2002) have used 10 biological parameters to measure AL: systolic and diastolic blood pressure (SBP and DBP), waist-to-hip ratio (WHR), serum high-density lipoproteins (HDL), total cholesterol, glycosylated hemoglobin ( $Hb_{A1c}$ ), serum dihydroepiandrosterone sulfate (DHEA-S), 12-hour urinary cortisol excretion, and 12-hour urinary norepinephrine (NE) and epinephrine (EPI) excretion. An AL score is calculated by summing the number of parameters (SBP, DBP, WHR,  $Hb_{A1c}$ , cortisol, NE, and EPI) in which levels were in the highest quartile and the parameters (HDL and DHEA-S) in the lowest quartile. Other researchers have used a subset of these measures or have substituted alternative mea-

sure, such as body mass index (BMI), C-reactive protein (CRP), and tumor necrosis factor alpha (TNF- $\alpha$ ) (Crimmins, Johnston, Hayward, & Seeman, 2003; Langelaan, Bakker, Schaufeli, van Rhenen, & van Doornen, 2007; Sabbah, Watt, Sheiham, & Tsakos, 2008; Schnorpfeil et al., 2003).

Although the majority of previous research on AL has been conducted with general population samples, a few studies have considered AL in relation to occupational stressors. For example, Schnorpfeil et al. (2003) reported that self-reported job demand was associated with higher AL scores among German industrial workers. In a study of school teachers in Germany and Luxembourg, Bellingrath, Weigl, and Kudielka (2008) observed significantly higher AL scores among those reporting high effort-reward imbalance at work. And, von Thiele, Lindfors, and Lundberg (2006) found that work-related fatigue increased the risk for higher AL among Swedish women working in public health organizations.

No previous research was found that examined the impact of AL in a sample of immigrant workers with minority status “employed” under unstable, precarious conditions. Given the circumstances and conditions in which Latino day laborers live and work, it is reasonable to suspect that they bear significant AL. They work in unsafe, unregulated conditions, are exposed to uncontrolled occupational hazards, and are not provided safety or PPE. Regarding broader work organization issues, these workers have no formal workplace structure, but rather temporary employment situations and job tasks (primarily manual labor) that change on a daily basis and for which they are paid low wages in cash. In the United States, the demand for contingent workers, including day laborers, has increased, reducing employer costs and potentially exploiting workers, particularly those who are undocumented. Workers in urban areas are more likely to be hired to fill day labor jobs in home repair, construction, food service, and cleaning services. Further, Latino day laborers may face discrimination, both interpersonally and institutionally, because of their minority and documentation status. Finally, it is not uncommon for these workers to have transitory lives, moving between various cities in search of work, and they are often separated from family or other social support networks. The combination of work-related, economic, and social stressors encountered by Latino day laborers can have a profound effect on individual health status and may contribute to disparate health for Latinos over and above experiencing a work-related injury or illness.

## STUDY PURPOSE

This article presents descriptive data from a pilot study assessing the feasibility of conducting research on work-related, economic, and social stressors experienced by Latino day laborers and their potential impact on health and AL. Second, the authors report methods and procedures for navigating the issues related to accessing this difficult-to-reach population as well as recruiting study participants. Additionally, the authors illustrate how academic institutions and local community-based organiza-

tions can effectively work together to conduct research. The underlying purpose of this research project was to evaluate the feasibility of conducting a study involving an interview survey and the collection of biological markers for AL among Latino day laborers.

## METHODS

### *Study Participants*

This pilot study involved collaboration between researchers at the University of Washington and CASA Latina, a worker center in downtown Seattle. Although worker centers operate in different ways, many function as organized systems for hiring day laborers. They provide a space for more equitable hiring practices, including holding a lottery for distributing jobs and setting wage scales for various jobs.

A total of 30 male day laborers of Latino descent participated in this pilot study. Recruitment and enrollment were integrated into the morning job lottery system at CASA Latina. Recruitment announcements briefly explaining the research project and procedures were read in Spanish at the beginning of the job lottery, indicating that participants would be paid \$60 cash for 4 hours (\$15 per hour is commensurate with the rates for gardening and moving). After the job lottery, another lottery was held for the opportunity to participate in the study. This was done to avoid interfering with standard operating procedures and the opportunity to obtain “real” work for the day, which sometimes leads to more long-term employment. Five day laborers were selected and enrolled per day. Only one individual refused to participate after being selected, which occurred after the consent process. Private office space at CASA Latina was used for the consent process. To obtain informed consent, a research team member read the consent form in either English or Spanish (as preferred by the study participant) to address the potential for low literacy. In addition, a CASA Latina staff member served as an impartial witness to ensure that informed consent was obtained without coercion. Approval to conduct this study was provided by the Human Subjects Division at the University of Washington.

### *Data Collection*

Study participants were driven from CASA Latina to the University of Washington for data collection. Spanish-speaking research team members conducted survey interviews and were available during the collection of biological measures. After data collection was completed, study participants were driven back to CASA Latina.

### *Measures*

**Allostatic Load.** For the pilot study, six AL indicators were collected: (1) height and weight for BMI; (2) waist and hip circumference in centimeters for WHR; (3) SBP; (4) DBP; (5) CRP, a marker of inflammation, through dried blood spots; and (6) salivary cortisol, a stress hormone. For SBP and DBP, study participants were seated and two readings were taken and averaged. To collect dried blood spots for CRP, a finger tip was pricked with a sterile lancet and blood was allowed to drop onto filter

Table 1  
**Sample Demographics**

<i>Characteristic</i>	<i>%<sup>a</sup></i>
Age in years	
<i>M</i>	45.8
<i>SD</i>	13.2
Years in the United States	
<i>M</i>	12.1
<i>SD</i>	9.7
Marital status	
Married	46.7
Separated, divorced, or widowed	23.3
Never married	30.0
Native language	
Spanish	96.7
Quiche	3.3
Country of birth	
Mexico	76.7
Guatemala	10.0
El Salvador	6.7
Honduras	3.3
Peru	3.3
Education	
None	6.7
Elementary school (grades 1 to 6)	43.3
Middle school (grades 7 to 8)	23.3
High school (grades 9 to 12)	10.1
College	3.3
Vocational school	13.3
Trained in a specific profession or occupation? <sup>b</sup>	
Yes <sup>c</sup>	16.7
No	43.3
Current job other than day labor?	
Yes	6.7
No	93.3

Note. <sup>a</sup>Numbers are percentages unless otherwise noted.  
<sup>b</sup>Thirty percent of the participants refused to answer this question. <sup>c</sup>These included chauffeur, air conditioning repair, tourism, military, and bricklayer. Of these, 60.0% stated they wished they were working in that job.

paper. Samples were then allowed to dry for at least 6 hours. A microtiter plate-based sandwich enzyme immunoassay was used to measure CRP in specimens eluted from dried blood spots overnight in assay buffer (Brindle,

Fujita, Shofer, & O'Connor, n.d.). Salivary cortisol was collected using a Sarstedt Salivette®, which involves the study participant chewing on a cotton roll for 1 minute. Participants did not eat or drink anything 30 minutes prior to collection. The authors acknowledge that a one-time morning saliva collection does not provide an ideal measure for cortisol levels. However, collecting this particular sample demonstrated that study participants were willing to undergo this sort of procedure. Conventionally, salivary cortisol is measured from three collections: just before sleeping, upon rising the next morning, and 30 minutes after rising. Salivary cortisol was analyzed using the typical enzyme-linked immunosorbent assay competitive binding strategy.

An AL score was calculated based on the conventional method of summing the number of biological parameters in which the study participant was in the highest quartile (above the 75th percentile within the sample) (Seeman et al., 2001; Seeman, Singer, Rowe, Horwitz, & McEwen, 1997). AL scores could range from 0 to 6, but for this sample the range was 0 to 4. The sample AL score was subsequently dichotomized at the median to obtain low (< 2) and high (≥ 2) categories.

**Survey Interview.** Survey questions assessed a variety of work-related, economic, and social stressors.

**Work-related Stressors:** Five questions, reflective of working under precarious or hazardous conditions, were asked (e.g., “Have you ever worked a job where you feared you might be hurt or killed?” and “Do you feel your immigration status affects how safe your job is?”). These were used in a previous study of urban day laborers conducted by Seixas et al. (2008). A question about employment frustration (“Do you find it difficult to find the work you want because you are of Latino descent?”) was also asked (Finch, Catalano, Novaco, & Vega, 2003). Response choices to these six items were yes or no. Participants were also asked how many years they had been working as a day laborer.

**Economic Stressors:** Four items were used to assess economic-related stressors. For example, participants were asked, “Would you say you have more money than you need? (not enough, just enough, or more than enough)” and “How do you feel about the economic opportunity you have had in the United States? (very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied).” These items have been used in previous studies of financial and economic strain (Aldana & Liljenquist, 1998; Krause, 1987; Krause, Jay, & Liang, 1991; Takeuchi, Williams, & Adair, 1991), including studies of immigrants (de Castro, Gee, & Takeuchi, 2009; Franzini & Fernandez-Esquer, 2004; Vega, Kolody, & Valle, 1987).

Additionally, subjective social status was measured with the ladder scale developed by Adler and colleagues (Adler, 2006; Adler, Epel, Castellazzo, & Ickovics, 2000). Participants were shown a drawing of a ladder with 10 rungs and told that the lowest rung represents those earning the least money, having the least education, and working in the least respected jobs or having no jobs, whereas the top rung represents those who are the best off. Par-

Table 2  
**Mean, Standard Deviation, Range, and Percentile Cut-Points for Allostatic Load Measures**

<i>AL Measure</i>	<i>Normal</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>25th Percentile</i>	<i>50th Percentile</i>	<i>75th Percentile<sup>a</sup></i>
SBP (mmHg)	< 120	129.2	18.7	102.5-189.0	117.5	124.0	138.0
DBP (mmHg)	< 80	79.5	10.0	55.0-98.5	72.5	79.0	87.5
BMI	18.4-24.9	28.4	6.4	20.9-55.5	24.7	27.2	28.5
WHR	< 1.0	0.9	0.1	0.8-1.1	0.9	0.9	0.9
CRP (mg/L)	-	2.1	4.0	0.1-21.6	0.4	0.8	1.8
Cortisol (salivary) (ng/ml)	-	13.9	33.0	3.1-187.9	5.5	7.4	10.7

Note. *AL* = allostatic load; *SBP* = systolic blood pressure; *DBP* = diastolic blood pressure; *BMI* = body mass index; *WHR* = waist-to-hip ratio; *CRP* = C-reactive protein. <sup>a</sup>Individuals having two allostatic load measures at or above the 75th percentile were categorized as “high AL.”

Participants were asked to separately identify on which rung they stood (1 being lowest and 10 being highest) currently and relative to others in the United States. This ladder scale has been used in several previous studies, including studies of immigrant populations (Adler et al., 2008; de Castro et al., 2009; Franzini & Fernandez-Esquer, 2006; Leu et al., 2008; Ostrove, Adler, Kuppermann, & Washington, 2000).

**Social Stressors:** Everyday discrimination was measured using a 9-item scale adapted from Williams, Yu, Jackson, and Anderson (1997). Participants were asked how frequently they perceived experiences of chronic and routine unfair treatment. Examples of items include, “You are treated with less courtesy than other people,” “People act as if they are afraid of you,” and “You are called names or insulted.” Responses ranged from 1 (never) to 6 (almost everyday); they were summed and then divided by 9 to calculate an everyday discrimination score. Scores ranged from 1 to 6 for this sample. Participants were subsequently asked to identify what they thought was the main reason for these experiences (e.g., gender, race, age, sexual orientation, other).

Eight items from the Hispanic Stress Inventory (Cervantes, Padilla, & Salgado de Snyder, 1990, 1991) were also included. Examples of these items included, “Do you feel guilty for leaving family or friends in your country of origin?”, “Do you feel that in the United States you have the respect you had in your country of origin?”, “Do you find it hard interacting with others because of difficulties you have with the English language?”, and “Do you think you will be deported if you go to a social or government agency?” Response choices to these items were yes or no.

**Health Status:** Two items assessing self-rated health were included. Participants were asked, “How would you rate your overall physical (or overall mental) health?” (1 = poor to 5 = excellent). These one-item measures have been shown to predict morbidity (Idler & Benyamini, 1997; Singh-Manoux et al., 2006). For this study, re-

Table 3  
**Distribution of Overall Allostatic Load Scores**

<i>Allostatic Load Score<sup>a</sup></i>	<i>% of Participants</i>
0	30.0
1	20.0
2	23.3
3	16.7
4	10.0
5	0.0
6	0.0

Note. <sup>a</sup>Possible range of 0 to 6. Allostatic load score of 0 to 1 was classified as low allostatic load; allostatic load score of 2 to 4 was classified as high allostatic load.

sponses were dichotomized into “poor/fair” and “good/very good/excellent,” consistent with prior studies (de Castro et al., 2009; Manor, Matthews, & Power, 2000; Ponce, Hays, & Cunningham, 2006).

An additional item assessing “unhealthy days,” used by the Centers for Disease Control and Prevention (CDC, 2000) to measure the effects of numerous disorders, short- and long-term disabilities, and diseases among different populations, was included. Participants were asked for the number of days in the past month that poor physical or mental health prevented their usual activities, such as self-care, work, or recreation. Six items from the CDC’s Behavioral Risk Factor Surveillance Survey (www.cdc.gov/BRFSS) assessed cigarette and alcohol use. These items measured respondents’ use of tobacco (i.e., current smoking status, lifetime smoking history, and daily cigarette consumption) and alcohol (i.e., drinking patterns in the past month). Questions included, “Do you now smoke

Table 4

**Percentage or Mean Score of Work-Related, Economic, and Social Stressors  
Among Day Laborers by Allostatic Load Score**

	<i>Low AL (n = 15)</i>	<i>High AL (n = 15)</i>	<i>Total (N = 30)</i>
<b>Work-related stressor</b>			
Years working as a day laborer ( <i>M; SD</i> )	4.6; 6.0	10.5; 8.7	7.6; 8.0
Have you ever worked a job where you feared you might be hurt or killed? (Yes)	33.3	53.3	43.3
Have you ever left or not done a job because it was dangerous? (Yes)	6.7	26.7	16.7
Would you report concerns of hazardous working conditions to the on-site employer? (Yes)	80.0	93.3	86.7
If faced with a workplace hazard, would you ask the employer for safety equipment/tools? (Yes)	100.0	93.3	96.7
Do you feel your immigration status affects how safe your job is? (Yes)	46.7	60.0	53.3
Do you find it difficult to find the work you want because you are of Latino descent? (Yes)	66.7	60.0	63.3
<b>Economic stressor</b>			
Would you say you have more money than you need?			
Not enough	80.0	100.0	90.0
Just enough	20.0	0.0	10.0
More than enough	0.0	0.0	0.0
How difficult is it for you to pay your monthly bills?			
Very	46.7	66.6	56.7
Somewhat	40.0	20.0	30.0
Not very	13.3	6.7	10.0
Not at all	0.0	6.7	3.3
How often in the past 12 months have you not been able to buy food?			
Often	39.9	33.3	36.7
Sometimes	46.7	53.3	49.9
Rarely	6.7	6.7	6.7
Never	6.7	6.7	6.7
How do you feel about the economic opportunity you have had in the United States?			
Very dissatisfied	6.7	13.3	10.0
Dissatisfied	33.3	53.3	43.3
Neither dissatisfied nor satisfied	33.3	26.7	30.1
Satisfied	20.0	6.7	13.3
Very satisfied	6.7	0.0	3.3
Subjective social status at this current time; range = 1 to 10 ( <i>M; SD</i> )	4.7; 2.3	3.8; 2.1	4.3; 2.2
Subjective social status relative to others in the United States; range = 1 to 10 ( <i>M; SD</i> )	3.2; 1.4	3.9; 1.9	3.5; 1.6
<b>Social stressor</b>			
Everyday discrimination <sup>a</sup> ; range = 1 to 6 ( <i>M; SD</i> )	2.0; 1.0	2.5; 1.3	2.2; 1.1

Do you feel guilty for leaving family or friends in your country of origin? (Yes)	40.0	40.0	40.0
Do you feel that in the United States you have the respect you had in your country of origin? (Yes)	53.3	33.3	43.3
Do you feel that living out of your country of origin has limited your contact with family or friends? (Yes)	73.3	66.7	70.0
Do you find it hard interacting with others because of difficulties you have with the English language? (Yes)	86.7	66.7	76.7
Do people treat you badly because they think you do not speak English well or speak with an accent? (Yes)	26.7	26.7	26.7
Have you been questioned about your legal status? (Yes)	20.0	53.3	36.7
Do you think you will be deported if you go to a social or government agency? (Yes)	53.3	73.3	63.3
Do you avoid seeking health services due to fear of immigration officials? (Yes)	33.3	33.3	33.3

Note. AL = allostatic load. Low AL = 0 to 1; high AL = 2 to 4. <sup>a</sup>Top three reasons for experiencing everyday discrimination were "race" (7 participants), "ancestry or national origin" (6 participants), and "skin color" (2 participants).

cigarettes every day, some days, or not at all?" and "In the past month, on the days when you drank, how many drinks did you have?"

**Demographics:** Participants were also asked general demographic questions. These involved age, marital status, native language, country of birth, education, year first arrived in the United States, previous training in a specific profession or occupation, and whether a participant currently held another job in addition to being a day laborer.

### Analysis

Percentages and mean scores, as appropriate, were calculated for each of the study measures for the entire sample as well as by low and high AL categories. Although this was a pilot study with a sample size of only 30 participants, differences in scores between low and high AL groups were explored using either *t*-tests or Fisher's exact test. All analyses were conducted using the STATA 10.0 statistical package.

## RESULTS

Table 1 displays demographic characteristics of the sample. On average, the participants were 46 years old and had been in the United States for 12 years. Most were married (47%), natively spoke Spanish (97%), were from Mexico (77%), and had completed some elementary school as their highest level of education (43%). Approximately 17% stated that they had previous training in a specific profession or occupation, and only 7% currently held another job in addition to working as a day laborer.

For each of the six AL measures examined, means with standard deviations and ranges are displayed in Tables 2 and 3. Mean SBP and DBP were 129.2 and 79.5 mmHg, respectively. The sample had an average BMI of 28.4 and an average WHR of 0.9. Mean CRP and salivary cortisol levels were 2.1 mg/L and 13.9 ng/ml, respectively. Table 2 also shows the 25th, 50th, and 75th percentile

scores for each of the AL measures. As described above, individuals' AL score was based on the number of biological measures for which they were above the 75th percentile. AL scores ranged from 0 to 4, with the largest group (23.3%) scoring 2 (Table 3). Those with AL scores of 0 or 1 were classified as low AL (50% of study participants) and those with AL scores of 2, 3, or 4 were classified as high AL (50% of study participants).

Table 4 provides descriptive statistics for work-related, economic, and social stressors by low and high AL groups and the total sample. Overall, no statistically significant differences were observed between the two groups across all measures. On average, those with high AL had been working as a day laborer for nearly 11 years, compared to just under 5 years for those with low AL. Furthermore, participants with high AL had worked in a job with a fear of being hurt or killed (53% vs. 33%), had left a job because it was dangerous (27% vs. 7%), were more likely to report concerns about hazardous working conditions to employers (93% vs. 80%), and felt that their immigration status affected how safe their job was (60% vs. 47%). In contrast, more of those with low AL reported that it is difficult to find the work they want because of their Latino descent (67% vs. 60%).

Regarding economic stressors, generally more of those with high AL reported not having enough money, having difficulties paying bills and buying food, and being dissatisfied to very dissatisfied with their economic opportunity in the United States, compared to those with low AL. Also, those with high AL rated their current subjective social status lower than that of those with low AL (3.8 vs. 4.7) but higher relative to others in the United States (3.9 vs. 3.2).

In terms of social stressors, those with high AL reported higher everyday discrimination scores (2.5 vs. 2.0), having been questioned about their legal status (53% vs. 20%), and fear of being deported if they went to a social or government agency (73% vs. 53%). Additionally,

Table 5

**Percentage or Mean Score of Health Status, Smoking, and Alcohol Use Among Day Laborers by Allostatic Load Score**

	<b>Low AL (n = 15)</b>	<b>High AL (n = 15)</b>	<b>Total (N = 30)</b>
<b>Health status</b>			
Self-rated physical health			
Fair/poor	60.0	93.3	76.7
Excellent/very good/good	40.0	6.7	23.3
Self-rated mental health			
Fair/poor	46.7	46.7	46.7
Excellent/very good/good	53.3	53.3	53.3
In the past month, the number of days that poor physical or mental health prevented your usual activities, such as self-care, work, or recreation (M; SD)	2.1; 4.6	5.1; 10.4	3.7; 8.1
<b>Smoking</b>			
Smoked at least 100 cigarettes in lifetime (Yes)	46.7	60.0	53.3
Frequency of cigarette smoking <sup>a</sup>			
Everyday	42.8	11.1	25.0
Some days	28.6	22.2	25.0
None at all	28.6	66.7	50.0
Number of cigarettes per day			
Among everyday smokers (M; SD)	5.3; 4.0	15.0 <sup>b</sup>	7.8; 5.9
Among some days smokers (M; SD)	2.5; 0.7	1.5; 0.7	2.0; 0.8
<b>Alcohol use</b>			
In the past month, had at least one alcoholic drink (e.g., beer, wine, liquor) (Yes)	13.3	40.0	26.7
In the past month, on days when drank, number of drinks had; only among those having had at least one alcoholic drink in past month (M; SD) <sup>c</sup>	6.5; 7.8	3.8; 4.3	4.5; 4.8
In the past month, the number of times had 5 or more drinks on an occasion; only among those having had at least one alcoholic drink in the past month (M; SD) <sup>d</sup>	0.5; 0.7	2.4; 2.9	1.9; 2.5

Note. AL = allostatic load; low AL = 0 to 1; high AL = 2 to 4. <sup>a</sup>Percents based on 16 total participants who had smoked at least 100 cigarettes in lifetime (n = 7 in low AL group, n = 9 in high AL group). <sup>b</sup>Only one individual in this cell. <sup>c</sup>Percents based on 8 total participants who had at least one alcoholic drink in the past month (n = 2 in low AL group, n = 6 in high AL group). <sup>d</sup>Percents based on 7 total participants who had at least one alcoholic drink in the past month (n = 2 in low AL group, n = 5 in high AL group) as 1 participant was "not sure" for this question.

fewer of the high AL group felt they had the same respect they had in their country of origin (33% vs. 53%).

Finally, Table 5 shows descriptive statistics for health status measures by low and high AL groups and the total sample. Comparing the low and high AL groups, more high AL workers reported fair/poor physical health (93%) and more low AL workers reported excellent/very good/good physical health (40%). Additionally, those with high AL reported an average of 5.1 unhealthy days in the past month, compared to 2.1 for those with low AL. More of those with high AL smoked at least 100 cigarettes in their lifetime (60%), had at least one drink of alcohol in the

past month (40%), and drank 5 or more alcoholic drinks an average of 2.4 times in the past month, compared to those with low AL (47%, 13%, and 0.5 times, respectively).

## DISCUSSION

This pilot study primarily evaluated the feasibility of conducting research with Latino day laborers, a hard-to-reach worker population. Specifically, the researchers assessed whether these workers would participate in a study involving the collection of biological markers and a survey interview exploring how work-related, economic,

and social stressors might contribute to AL among Latino day laborers. AL has been used as a composite measure of the physiologically damaging response to exposure to chronic stressors in general population studies, but few have specifically focused on the experience of worker populations. Previously published research considering AL among workers was primarily conducted in Europe with native-born samples who had relatively stable employment (Bellingrath et al., 2008; Schnorpfeil et al., 2003; von Thiele et al., 2006). No study was found that had been conducted among immigrant and contingent workers. The examination of AL has particular relevance for Latino day laborers, who face extreme chronic stressors such as long-term employment insecurity, working in unregulated high-hazard jobs, exploitation, discrimination, separation from family and friends, and the inability to pay for housing and food. These factors independently and in concert can have detrimental effects on health status at the individual level, and can also contribute to broader health disparities at the population level.

Although the data are from a small sample ( $N = 30$ ), study findings suggest that stressors in the contexts of work, economics, and society may contribute to high AL for Latino day laborers. For example, those with high AL had been working as day laborers for an average of 11 years, compared to 5 years for those with low AL. This indicates that chronic employment insecurity adversely affects physiologic health. Regarding economic and social stress, those with high AL reported lower general subjective socioeconomic status and higher everyday discrimination scores compared to those with low AL. These findings are consistent with previous studies examining the adverse health impact of job insecurity (Ferrie, Shipley, Stansfeld, & Marmot, 2002; Quinlan & Bohle, 2009), low subjective socioeconomic status (Adler et al., 2000, 2008), and discrimination (Gee, Ryan, Laflamme, & Holt, 2006). Additionally, a variety of health status measures were explored in relation to low and high AL. Those with high AL rated their physical health much worse and reported a greater overall smoking history (as defined by smoking more than 100 cigarettes in their lifetime) and consumption of alcohol.

Overall, these findings suggest that working as a day laborer has potential health consequences beyond simply experiencing an injury or illness directly resulting from a worksite hazard (e.g., falling from a rooftop or a struck-by incident). Because AL is a measure of physiologic “wear and tear” reflective of pre-clinical disease outcomes, this study suggests that the stressful experiences of day laborers have implications for health outcomes that may not be readily perceived to be “work-related.” Further investigation that considers more specific clinical health outcomes and how AL mediates relationships between the kinds of stressors that day laborers encounter is needed to more fully evaluate this hypothesis.

Although the researchers contrasted a variety of measures between those with low and those with high AL within this sample, comparison to general population samples of Latinos could provide insight into the relative stress experience and health status of day laborers.

For example, previous studies note that 1% and 4% of a nationally representative sample of Mexicans reported being very dissatisfied and dissatisfied, respectively, with economic opportunity in the United States (Guarnaccia et al., 2007), whereas, overall, this study sample reported 43% and 10%, respectively. In terms of subjective social status, a general population of Mexican immigrants reported a mean score of 4.7 (Franzini & Fernandez-Esquer, 2006), whereas this sample’s overall score was 4.3. Another study of labor migrants reported that 20% experienced difficulties finding work they wanted because of their Mexican descent (Finch et al., 2003); 63% of this sample reported so. Additionally, this sample reported lower ratings for general physical and mental health compared to those in the National Latino and Asian American Study (NLAAS). Seventy-seven percent and 47% of this sample rated their physical and mental health as fair or poor, respectively; the NLAAS reported 28% and 12%, respectively (Mulvaney-Day, Alegria, & Sribney, 2007). Collectively, these examples suggest that Latino day laborers experience greater severity of stressors and are less healthy than the general Latino population.

The primary objective of this pilot study was to assess the feasibility of conducting research with an immigrant day labor population, collecting interview and biologic data. Because of important, sensitive characteristics specific to the day labor population (e.g., low socioeconomic status, working on a contingent basis, having undocumented status, and potential suspicion of university-based researchers), the study staff had no previous knowledge or experience regarding how day laborers would respond to participating in such a study or whether the worker center, CASA Latina, would be receptive to the recruitment of study participants at its location.

The researchers note that before this pilot study was undertaken, members of the research team had established a trust relationship with CASA Latina during 4 years by providing a variety of services, such as assessing occupational exposures, injuries, and illnesses (Seixas et al., 2008), providing health and safety training, and trialing an injury and illness surveillance system. This allowed the authors to comfortably propose this pilot to CASA Latina’s leadership. The researchers directly consulted CASA Latina’s staff about how to maintain the center’s operations and respect sensitivities of day laborers’ concerns and culture. Soliciting input provided insights that informed the successful conduct of this pilot study.

In terms of day laborers’ response to participating in the study, only one individual, among those selected through the lottery, refused to participate. This occurred when obtaining informed consent. The high participation rate could be attributed to two primary reasons. First, recruitment was held among those day laborers who were not selected for a job. The alternative to not working and not earning any money was to earn \$60 for participating in the study. Second, after the initial two groups participated in data collection, word about the project spread among other day laborers, especially that study participants had a positive experience.

It was also important to include a service benefit for study participants. Again, in consultation with CASA Latina staff, study participants were screened for potential hypertension, although none met criteria for clinical referral. All participants were given a list of local health clinics, including those serving primarily Latino clients, and counseled as to where they could receive health care services free of charge and without need to show documentation.

## LIMITATIONS

Because the research was a pilot study, the researchers were limited to a small sample size of 30 study participants. As such, the authors were unable to test for correlations between stressors and AL or to detect differences across measures between low and high AL groups. However, the data did allow the researchers to assess trends that provide preliminary insight into the stressor-AL experience for immigrant day laborers. Additionally, the researchers did not collect the full battery of AL measures (e.g., Hb<sub>A1c</sub>, NE and EPI, HDL, and DHEA-S) conventionally used in previous research, primarily due to cost and logistical difficulties with sample collection (e.g., collecting 12-hour overnight urine for NE and EPI). They were also unable to collect multiple saliva samples for cortisol, which is ideally obtained three times (before sleeping, upon rising, and 30 minutes after rising). Further, they note that elevated CRP may be associated with muscle damage after high physical exertion (Kim, Lee, & Kim, 2007; Neubauer, Konig, & Wagner, 2008), potentially confounding its use as an indicator of AL, particularly among day laborers, who typically take on physically demanding jobs. Future studies should include a wider array of biological markers that can be used to derive a richer, more complete measure of AL. Despite this, the study included a selection of biological markers that use different collection techniques (e.g., saliva, dried blood spots, BP, and anthropometric measurement), revealing that day laborers were willing to participate in such data collection. The authors also recognize that interview responses are based on self-report, which is potentially subject to recall and social desirability biases. Future studies could collect qualitative data in addition to survey data to tap into stress constructs that standardized instruments may not fully capture. Finally, because the data are cross-sectional, the researchers believe that a prospective study would better reflect the chronic impact of stressors among day laborers. It is possible that these data are subject to the healthy worker effect. As such, longitudinal data could better track changes in AL measures and other aspects of health status.

## IMPLICATIONS FOR PRACTICE

The profile of the U.S. work force is changing. First, it is becoming increasingly racially and ethnically diverse. Second, it is becoming increasingly contingent. Previous reports highlight disparate health consequences among minority workers (Birdsey, Alterman, & Petersen, 2007; Friedman & Forst, 2008; Murray, 2003) and workers threatened with job insecurity (Ferrie et al., 2002; Quin-

lan & Bohle, 2009; Rugulies, Aust, Burr, & Bultmann, 2008). Latino day laborers, many being undocumented immigrants and contingently employed over long periods, are simultaneously confronted with extreme forms of stressors related to these characteristics. This study sheds light on the variety of stressors that day laborers experience and their impact on physical health. These workers would benefit from services that occupational health nurses could provide, most notably worker training about injury prevention and health education. More broadly, day laborers need preventive, public health-oriented nursing services, which occupational health nurses are trained to deliver.

This study also applies the concept of AL to chronic stressors in an immigrant, contingent work context. As stated, the examination of AL has not been previously conducted with day laborers. Given the positive experience with this project, the researchers are optimistic that a more comprehensive study of AL is possible. Occupational health nurses can assume several roles in studies of AL, such as informing research questions, determining features of study design and protocol, participating in data collection, and crafting interventions based on research findings.

Further, this project demonstrates that research collaborations can be successfully developed between academic institutions and community-based organizations. As advocates for worker health, occupational health nurses can encourage and facilitate such relationships. Being mindful of workers' circumstances and needs while concurrently understanding the goals of research, occupational health nurses can serve a key role in negotiating the benefits for both parties. Also, occupational health nurses have a responsibility to ensure that the ethical treatment of workers is a priority. This can be especially important when addressing sensitive issues about workers, such as documentation status among Latino day laborers.

Finally, this study was conceptualized with an expanded perspective of occupational health. Guided by an ecological framework, this study takes into account how broader economic and social factors beyond the workplace contribute to worker well-being. Occupational health nurses should consider how factors external to the immediate work environment and spanning the many layers of society impact the health of worker populations. Such factors can have work performance and organizational implications for worker productivity, absenteeism, and presenteeism.

## CONCLUSION

This study explored how stressors relevant to Latino day laborers may have consequences for AL, a composite measure of the physiologic burden of chronic stress. Findings suggest that Latino day laborers are potentially at risk for high AL in relation to work-related, economic, and social stressors. The researchers also demonstrated that a study involving the collection of interview and biologic measures with this hard-to-reach population is feasible. However, from the authors' experience, success

of such an undertaking is predicated on establishing trust and working collaboratively to determine study goals and procedures with the partnering community-based organization. The prospect of conducting a larger-scale research project that can more comprehensively examine the stressor-AL relationship among day laborers is promising.

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