The influence of demographics and working conditions on self-reported injuries among Latino day laborers

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Background: The majority of day laborers in the USA are Latinos. They are engaged in high-risk occupations and suffer high occupational injury rates.
Objectives: To describe on-the-job injuries reported by Latino day laborers, explore the extent that demographic and occupational factors predict injuries, and whether summative measures for total job types, job conditions, and personal protective equipment (PPE) predict injuries.
Methods: A community survey was conducted with 327 participants at 15 corners in Houston, Texas. Hierarchical and multiple logistic regressions explored predictors of occupational injury odds in the last year.
Results: Thirty-four percent of respondents reported an occupational injury in the previous year. Education, exposure to loud noises, cold temperatures, vibrating machinery, use of hard hats, total number of job conditions, and total PPE significantly predicted injury odds.
Conclusion: Risk for injury among day laborers is not only the product of a specific hazard, but also the result of their exposure to multiple occupational hazards.

Keywords: Day labor, Immigrant workers, Latino workers, Occupational exposures, Self-reported injuries, Socioeconomic determinants

Introduction

Hispanics account for the largest group of immigrants employed in the US labor force (49.4%).[1] Although previous studies have highlighted the high incidence of immigrant workers' occupational injuries and deaths using secondary data sources such as medical records, labor statistics and workers' compensation claims, few have focused on self-reported occupational injuries. Foreign-born workers are generally younger, poorer, less educated, and less proficient in English than native-born laborers.[2–5] These characteristics, in combination with limited occupational skills and unfamiliarity with the US job market, limit many immigrants to unskilled or entry-level jobs in low-paying industries with high rates of injury.[6,7] A report by the American Federation of Labor & Congress of Industrial Organizations estimated that Latino immigrants accounted for the largest proportion of fatally injured foreign-born workers and that their work-related injury death rate exceeded the rate for all US workers for most years between 1992 and 2006.[8,9]

Construction has a rapidly growing Latino work force and increased occupational deaths have been reported among Latinos. Latino workers accounted for 34% of occupational fatalities between 2003 and 2006, an increase from 27% in occupational fatalities between 1992 and 2002.[2,9] Most Latino immigrants are employed in the construction industry as construction laborers engaged in tasks such as cleaning and preparing construction sites, digging trenches, placing concrete and asphalt, and operating machinery.[7,10–12]

Latino day laborers

A subset of Latino immigrant workers seek employment as day laborers at street corners or informal hiring sites.[6,13–16] Latino day laborers (LDL) frequently find temporary work in dangerous construction or industrial occupations, without health or workers' compensation benefits, and often without personal protection equipment (PPE). Many of these workers do not receive any kind of job safety training and feel intimidated raising safety concerns at work.[17,18] Owing to the short-term

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informal work agreement between day laborers and their employers, few know that they are entitled to the same legal rights of most workers, even when confronting hazardous and exploitive job conditions.[19,20]

Studies focusing on day laborers have found high rates of non-fatal occupational injuries.[14,21,22] A study among day laborers in Seattle estimated an injury rate of 31 recordable injuries per 100 FTE (full time equivalent) workers, much higher than the recordable injury rate of 6.2 per 100 FTE reported for all construction workers by the Bureau of Labor Statistics in 2004.[14,23]

Some of the factors contributing to injury among day laborers include hazardous work site conditions (e.g. falling objects, electrical hazards, scaffolding), potentially dangerous work (e.g. roofing, using power equipment), a lack of adequate personal safety equipment, and inadequate on-the-job training or site-specific information.[24] Day laborers face exploitive work conditions, including working long hours with pressure to complete work quickly.[25] They are often denied breaks during working hours, even to eat and drink water — essential in locations such as Texas, where temperatures reach over 100°C in the summer.[3,24,25] They are paid at or below poverty level wages and it has been reported that 49% of LDLs experience wage theft, sometimes after working for days or even weeks.[25]

Demographic characteristics

According to Valenzuela, immigrants from Mexico account for over three fourths of the nationally surveyed day laborers in the USA.[15] The foreign-born have an average educational attainment of seven years, compared with US-born Latino laborers who have typically completed high school.[15,18] English proficiency of day laborers ranges from 62% reporting speaking English "well" to 84% speaking "little or no English".[7,13] Half of day laborers are married (living with or separated from a partner), suggesting that they may be contributing to US households.[15]

Study Aims

Previous studies of occupational injuries and illnesses in day laborers have described the association between Latino day laborers' working conditions and occupational exposures.[13,14,23,26–28] Although one prior report investigated working conditions among construction workers in the state of Texas and one injury prevention community-based participatory research study was conducted among Hispanic construction workers, to our knowledge, there are no published studies documenting self-reported on-the-job injuries among LDLs in Texas.[29,30] In this study, we (1) describe injuries reported by day laborers in Houston, Texas, (2) explore the extent to which demographic and occupational risk factors predict self-reported on-the-job injuries, and (3) explore whether summative exposure measures for the total job types, total job conditions, and total PPE predict self-reported occupational injuries.

Methods

The SHILOS survey (*Salud de los Hombres Inmigrantes Latinos* or *The Health of Immigrant Latino Men*) is the first survey of the health and working conditions of LDLs in Texas.[31] This survey was administered between October and December 2008 on street corners where day laborers congregate to seek employment and sought to examine the prevalence of health risk behaviors and self-reported occupational injuries among immigrant LDL. This study was approved by the Committee for the Protection of Human Subjects at the University of Texas at Houston Health Sciences Center.

Site selection

A list of 31 local day labor 'corners' (public gathering points such as street corners, bus stops, small strip malls, large home improvement stores, and gas stations) was compiled based on observations by local community organizations in 2006 and 2007. The three criteria for a corner to be included in the study were: (1) the site was located within the Houston metropolitan area; (2) it constituted an independent corner as defined by at least three blocks of physical distance from the next closest corner; and (3) day laborers were observed seeking employment at that location. Additional observations were conducted by the SHILOS team prior to the corner-based survey during the months of June and July 2008, alternating morning (8 a.m.–10 a.m.) and afternoon (2 p.m.–4 p.m.) observations. After completing the observations, 16 corners were excluded for the following reasons: (1) corners recruited during the formative phase of the study were eliminated to prevent data contamination ($n=5$); (2) workers were no longer present, or they were not found at the referenced time of observation ($n=6$); and (3) a cluster of corners was grouped as a single corner due to their close proximity (less than three blocks) to each other ($n=5$). A total of 15 corners were included in the SHILOS survey: two home improvement stores, two gas stations, one vacant lot, and 10 street corners.

Worker sampling and recruitment

The number of workers at each corner was estimated by averaging counts from 2006, 2007, and SHILOS' team observations in 2008. The total count of day laborers present at the 15 recruited corners was estimated to be 877. We adopted the rapid assessment response and evaluation method developed by Trotter.[18] This method has been used to document urban health disparities[19] and collect risk behavior

data in high risk populations.[32] Consistent with these strategies, we set a convenience sample of 360 interviews and systematically sampled the 15 available corners using a proportional quota of 40% based on the corner size (n=6–81). The interview quota was met or exceeded in 10/15 corners and interviews completed in the remaining five corners represented 60–90% of the expected cases at each location. While the target sample size was 360, due to time constrictions and sample saturation, 327 interviews were completed. Data collection started 1 month after Hurricane Ike, which affected the Houston area and may have affected corner size temporarily as workers migrated to other locations offering better job opportunities. To reduce the possibility of repeated interviews, we attempted to complete the interview quota on each corner in a short time, and assigned the same interviewer to particular corners in an effort to ensure interviewers' recall of surveyed participants. In large corners where multiple interviewers were needed, interviewers remained close in proximity to monitor group participation.

Data collection instrument and survey administration

The SHILOS survey assessed health and work-related risk behaviors among local day laborers. The questionnaire included standardized worker practices and exposure scales and new measures based on formative data collected with 29 individuals participating in four focus groups (n=18) and in-depth interviews (n=8) (three focus group participants were later interviewed in-depth, to obtain further details to inform the questionnaire development).

The survey included questions regarding (1) sociodemographic characteristics (age, years of education, language use and preference, marital status, and length of time living in the USA); and (2) experience of work-related injuries, illnesses and accidents, work history and job conditions in the past year, based on the Construction Worker Safety Questionnaire.[3,33] Work-related variables included: (1) type of jobs completed in the preceding year (cleaning of houses, offices and apartments, work at restaurants/hotels, construction, lawn work, painting, carpentry, electric, moving and plumbing); (2) exposure to on-the-job hazardous situations or conditions (slippery floors, extreme heat, loud noises, risk of cutting themselves, risk of falling, too much sun, too much cold, insufficient ventilation, lifting heavy things, breathing dust or gases, use of machinery that vibrates and risk of electrocution); and (3) use of PPE including gloves, hard hats, protective lenses, ear plugs, raincoats, back braces, boots, and face masks. All work-related variables were assessed on a three-point response scale (0=never, 1=sometimes, 3=very frequently/all the time). Responses for all work-related variables were dichotomized (no and sometimes/frequently).

Five Latino interviewers whose primary language was Spanish and who were familiar with both the Houston metropolitan area and the target population were trained in field interviewing techniques and survey administration procedures to complete a face-to-face interview. Interviewers visited the 15 corners to recruit and interview day laborers. Number of visits per corner depended on quota size at each location and worker availability at the time of recruitment.

Before completing the SHILOS survey, interviewers described the objective of the study and requested anonymous consent from each worker. Each interviewed worker received an incentive gift or a cash payment ($10) at the completion of the interview. Interviews were conducted from October to December 2008 and lasted an average of 42 minutes.

Data variables

For the regression analyses, marital status (yes and other), language preference (Spanish and other), and injury status (yes and no) were dichotomized. Age, education, time in the USA, and time seeking work at the corners were measured as continuous variables in years. All variables measuring types of jobs performed, exposure to hazardous job conditions, and PPE used in the preceding year were dichotomized (never and sometimes/frequently). To further understand risk of injury among day laborers we created three summative measures: (1) the total number of hazardous job conditions exposed to at work; (2) total number of jobs; and (3) total number of protective equipment used in the preceding year.

Data analysis

We estimated the prevalence of all demographic and work related variables. Descriptive statistics were computed for all variables, including frequencies and proportions for categorical variables and the mean and range for continuous variables. A hierarchical logistic regression analysis was conducted to explore the extent that individual demographic, job type, job conditions, and PPE predicted the odds of self-reported occupational injury. A multiple logistic regression analysis explored whether demographic variables and summative measures of total job types, total job conditions, and total PPE predicted the odds of self-reported occupational injury. Missing data in both logistic regressions were deleted list-wise.

In the first logistic regression, demographic items were entered as independent variables in the initial block with injury status as the outcome. Job type, job conditions, and PPE variables were entered in the second, third, and fourth blocks, respectively. The block Chi-square statistic and associated P-value

were used to assess the significance of each block. In the second logistic regression, all summative measures and demographic variables were entered in a single block. The significance of the individual variables in each model was assessed using the *z*-statistic and associated *P*-value. Odds ratios and 95% confidence intervals were computed for all variables. A significance level of $P \leq 0.05$ was used to specify statistically significance.

Results

The objective of the study was to describe the prevalence of self-reported occupational injuries among LDLs in Houston and determine the extent to which demographic and hazardous job conditions influenced the odds of reporting on-the-job injury experiences.

Of the 327 respondents interviewed, two were excluded because they were not day laborers. One respondent was picked up for work during the interview and was excluded from analysis. Another was excluded because he did not report engaging in the types of jobs in the survey or any other employment in Houston. Injury history was missing for an additional five respondents. In total, nine participants were excluded from the analyses. All results are based on the 318 complete and valid interviews.

Demographic characteristics

All participants were male immigrants, mostly from Honduras (38.2%) and Mexico (37.2%). Most were Spanish monolinguals (57.1%) and married (33.3%). The mean age was 37.6 years and the mean education was sixth grade completion. On average, participants had lived in the USA for 7.2 years and had worked as a day laborer for 2.3 years. Participants reported working an average of 12.8 days in the past month, and 8.2 hours per day (Table 1).

Occupational injuries and illnesses

Approximately one-third of the workers (34.0%) reported on-the-job injuries or illnesses in the 12 months before the interview and 18.6% reported missing workdays due to on-the-job injury. The average LDL in our study sample worked approximately 1268 hours per year. Using the 59 reported injuries requiring days away from work, the estimated injury rate was 29 injuries per 100 FTE. If we assume LDLs work 1200 hours per year, as estimated by Valenzuela (2006) in a national day laborer study,[6] the injury rate in our study sample of LDL is 31 recordable injuries per 100 FTE.

Among respondents reporting an injury, the number of occupational injuries and illnesses in the preceding year ranged from 1 to 48. Sixty-three workers (19.8%) reported one occupational injury or

Table 1 Demographic characteristics of Latino day laborers sample, Houston, Texas

	N	%
Total	318	100.0%
Birthplace		
Mexico	118	37.2%
Honduras	121	38.2%
Guatemala	42	13.2%
El Salvador	30	9.5%
Nicaragua	3	0.9%
Cuba	1	0.3%
South America	2	0.6%
Language		
Only Spanish	181	57.1%
Spanish and other regional language from country of origin	6	1.9%
Spanish better than English	115	36.3%
Spanish and English equally	15	4.7%
Marital status		
Unmarried	98	30.8%
Married	106	33.3%
Living with a partner	61	19.2%
Separated/Divorced	50	15.7%
Other*	3	0.9%
Variable	$\bar{x}$	Range
Age†	37.6 years	21–75 years
Education†	6.3 years	0–16 years
Time of residence in the USA	7.2 years	<1 month to 40 years
Time working as a day laborer†	2.3 years	<1 month to 32 years
Days worked in the past month†	12.8 days	0–30 days
Hours worked per day‡	8.2 hours	2–18 hours

Note: *Includes widower or the participant did not want to specify.
†Results are based on non-missing data.
‡Results are based on participants who reported working at least 1 day in the past month and non-missing data.

illness in the preceding year, while 45 (13.8%) reported two or more injuries. Reported injuries and illnesses were classified according to the grouping categories defined by Zhang[5] with work-related non-fatal injuries and by Seixas with day laborers in Seattle.[14] Among the reported injuries requiring days away from work, falls (27.1%), cuts and lacerations (23.7%), and being struck by an object (18.6%) were reported most commonly. Almost half the injuries (45.0%) affected the upper extremities, and 21.7% affected the lower extremities.

Job types and job conditions

Day laborers performed multiple jobs depending on demand and availability. The jobs reported in Table 2 are not mutually exclusive and represent the proportion of workers indicating that they performed a particular job "sometimes or very frequently/all the time" in the previous 12 months. The most common jobs reported by participants were construction (88.1%), moving (80.8%), and painting (71.1%). Twenty-six percent (n=82) reported having another (i.e. non-corner) job in addition to the employment they were seeking at the corner. These additional jobs were often similar to the ones sought at day labor sites (e.g. roofing, painting, etc.), although some were very different (e.g. working at a flower shop, in security, selling cell phones, and working with a staffing agency).

Table 2 Job types, job conditions, and use of personal protective equipment (PPE) reported by participants for the preceding year

	N	%*
Job type†		
Cleaning houses, offices, apartments	193	60.7%
Restaurants/hotel	90	28.3%
Construction	280	88.1%
Lawns/landscaping	196	61.6%
Painting	226	71.1%
Carpentry	175	55.0%
Electrical	54	17.0%
Moving	257	80.8%
Plumbing	123	38.7%
Job conditions†		
Slippery floors	203	63.8%
Extreme heat	266	83.6%
Loud noises	216	67.9%
Risk of cuts or lacerations	230	72.6%
Risk of falling	259	81.49%
Too much sun	296	93.1%
Too much cold	242	76.3%
Insufficient ventilation	192	60.8%
Lifting heavy things	297	93.4%
Breathing dust or gases	270	85.2%
Use of vibrating machinery	210	66.5%
Risk of electrocution	124	39.4%
Use of protective equipment†		
Gloves	249	78.5%
Hard hats	178	56.0%
Protective lenses	229	72.0%
Earplugs	127	39.9%
Raincoats	106	33.4%
Back brace	104	32.9%
Boots	171	53.8%
Face mask	205	65.1%

Note: *Proportion of participants who answered "sometimes or very frequently." Results based on non-missing data.
†Categories are not mutually exclusive. Participants could report working in several job types, exposure to several job conditions and use of multiple personal protective equipment (PPE) in the preceding year.

Job conditions

The most frequently reported job conditions were lifting heavy objects (93.4%), excessive exposure to the sun (93.1%) or extreme heat (83.6%), and breathing dust or gases (85.2%) (Table 2). Each job condition represents the proportion of workers exposed to it "sometimes and very frequently/all the time" in the preceding year.

Use of personal protective equipment

The most commonly used PPE items were gloves (78.5%), protective lenses (72.0%), and facemasks (65.1%). Use of PPE items represent the proportion of workers indicating that they use PPE "sometimes and very frequently/all the time" in the preceding year (Table 2).

Summative measures

Approximately 57% of the workers reported working four to six different types of jobs in the preceding year, while 22.0% worked in one to three different job types in the same time period. About fifty percent (49.7%) reported exposure to 10 or more hazardous working conditions, and 31.2% were exposed to 7–9 conditions. Regarding PPE use, 31.2% reported using 4–6 PPE items and 30.5% reported using 1–3 PPE items in the preceding year. Twenty-two workers (7.1%) reported not using any of the protective equipment items listed in the survey.

Predictors of self-reported injury

Hierarchical logistic regression

In the first block, which consisted of the demographic variables, education was the only variable significantly associated with injury (OR=1.13; 95% CI: 1.03–1.22). However, the block as a whole significantly predicted the odds of self-reported injury (Block 1: Chi-square (df=6)=13.94, P=0.03). In the second block, which included the addition of the job type variables, no job type variables were significantly associated with injury and the block as a whole was non-significant (Block 2: Chi-square (df=9)=3.85, P=0.92), although education remained significantly associated with injury (OR =1.12; 95% CI: 1.03–1.22). Job condition variables were added in the third block. None of the individual job condition variables significantly predicted odds of injury. However, the overall block did significantly predict odds of injury (Block 3: Chi-square (df=12)=22.7, P=0.03) and education remained positively associated with injury (OR=1.15; 95% CI: 1.04–1.26). In the final block, PPE items were added. Of these, the

use of hard hats was inversely associated with injury (OR=0.30; 95% CI: 0.15–0.61). No other PPE variable was associated with injury. Among the demographic variables, education remained associated with injury (OR=1.12; 95% CI: 1.01–1.23). Among the exposure variables, injury was associated with exposure to loud noises (OR=2.20; 95% CI: 1.02–4.72), too much cold (OR=2.49; 95% CI: 1.11–5.60), and exposure to vibrating machinery (OR=2.21; 95% CI: 1.05–4.67). Blocks 1 through 3 accounted for 5, 6, and 13% of the variance in the injury outcome, respectively. The fourth block significantly predicted odds of injury (Block 4: Chi-square (df=8)=20.1, P=0.01). The final hierarchical logistic regression model consisting of all four blocks (Table 3) was statistically significant and predicted 19% of the variance in the injury outcome (Model Chi-square (df=35)=60.6, P=0.005).

Multiple logistic regression

In a second logistic regression, we entered all demographic characteristics and the multiple exposure summative variables (total types of jobs, total job conditions, and total PPE) as a single block to predict the odds of reported injury (Table 4). Results indicated education, total number of job conditions, and total PPE significantly predicted the odds of injury. The odds of injury increased by 14% for every 1 year increase in education level (OR=1.14; 95% CI: 1.04–1.24) and by 19% for each unit of increase in the total number of hazardous work conditions reported (OR=1.19; 95% CI: 1.07–1.33). The likelihood of injury decreased by 11% with each unit increase in the total number of PPE reported (OR=0.89; 95% CI: 0.80–1.00). All other independent variables were not significantly associated with the likelihood of injury.

Table 3 Demographic characteristics and injury risk factors as predictors of likelihood of self-reported work-related injury in the previous year*

	B	SE	Odds Ratio	95% CI	*P*
Independent variables					
Demographic					
Education†	0.11	0.05	1.12	(1.01, 1.23)	0.03
Marital status‡	−0.50	0.34	0.61	(0.31, 1.18)	0.14
Age†	0.02	0.02	1.02	(0.99, 1.05)	0.26
Time of residence in the USA†	−0.05	0.03	0.96	(0.91, 1.01)	0.11
Language: only Spanish‡	0.06	0.33	1.06	(0.56, 2.00)	0.86
Time working as a day laborer†	−0.02	0.05	0.98	(0.90, 1.08)	0.70
Job type					
Cleaning houses, offices, apartments‡	0.24	0.32	1.27	(0.68, 2.36)	0.45
Painting‡	−0.04	0.37	0.96	(0.47, 1.97)	0.90
Carpentry‡	−0.44	0.32	0.64	(0.34, 1.20)	0.17
Electrical‡	−0.52	0.39	0.59	(0.28, 1.27)	0.18
Construction‡	0.24	0.52	1.27	(0.46, 3.54)	0.65
Lawns/landscaping‡	−0.24	0.32	0.79	(0.42, 1.48)	0.46
Moving‡	−0.14	0.41	0.87	(0.39, 1.93)	0.74
Plumbing‡	0.51	0.31	1.66	(0.90, 3.07)	0.11
Restaurants/hotel‡	−0.02	0.33	0.98	(0.51, 1.87)	0.95
Job conditions					
Slippery floors‡	0.31	0.34	1.36	(0.70, 2.68)	0.37
Extreme heat‡	−0.80	0.47	0.45	(0.18, 1.12)	0.09
Loud noises‡	0.79	0.39	2.20	(1.02, 4.72)	0.04
Risk of cuts or lacerations‡	0.69	0.43	1.99	(0.85, 4.64)	0.11
Risk of falling‡	−0.32	0.53	0.73	(0.26, 2.05)	0.55
Too much sun‡	0.11	0.74	1.12	(0.27, 4.72)	0.88
Too much cold‡	0.91	0.41	2.49	(1.11, 5.60)	0.03
Insufficient ventilation‡	0.10	0.34	1.10	(0.57, 2.13)	0.78
Lifting heavy things‡	−0.73	0.68	0.48	(0.13, 1.82)	0.28
Breathing dust or gases‡	−0.35	0.48	0.71	(0.28, 1.80)	0.47
Use of vibrating machinery‡	0.79	0.38	2.21	(1.05, 4.67)	0.04
Risk of electrocution‡	0.09	0.32	1.09	(0.58, 2.05)	0.78
Use of protective equipment					
Gloves‡	−0.40	0.43	0.67	(0.29, 1.55)	0.35
Hard hats‡	−1.19	0.36	0.30	(0.15, 0.61)	0.00
Protective lenses‡	0.09	0.40	1.09	(0.50, 2.37)	0.83
Earplugs‡	−0.42	0.36	0.66	(0.32, 1.34)	0.25
Raincoats‡	−0.06	0.36	0.95	(0.47, 1.91)	0.88
Back brace‡	0.07	0.33	1.07	(0.57, 2.03)	0.83
Boots‡	0.58	0.35	1.78	(0.89, 3.56)	0.10
Face mask‡	−0.07	0.37	0.93	(0.48, 1.93)	0.84

Note: *The outcome variable is ever injured at work in the last year (1=yes, 0=no). Results based on non-missing data.
†Continuous variable measured in years.
‡Dichotomous variable measured as yes=1 and no=0.

Discussion

The purpose of this study was to determine the prevalence of self-reported occupational injuries among Houston LDL and to explore whether reported injuries were associated with demographic characteristics, occupational factors, and summative measures for total job types, total job conditions, and total PPE. Findings from our survey support trends reported in studies with similar workers in the USA and contribute to an understanding of their working conditions. The proportion of LDL reporting an occupational injury or illness in the preceding year (34%) was similar to injuries reported among Latino poultry workers (28%), day laborers in Chicago (31%), and other LDL studies that have used similar self-report injury assessment methods.[23,28,34,35] Furthermore, 19% of our sample reported missing days of work due to injury/illness, resulting in an estimated injury rate of 29 injuries per 100 FTE (using our estimated number of hours worked per year) or 31 injuries per 100 FTE (using Valenzuela's hours worked per year estimate).[6] Our estimated injury rate is consistent with prior LDL research and provides further evidence of the magnitude of occupational injuries faced by LDLs.[6,14,23]

The three most commonly reported injuries and illnesses (falls, cuts and lacerations, and being struck by an object) were also within the top four causes of injuries reported by foreign-born workers in the US National Health Interview Survey, 1997–2005 and by day laborers in Seattle.[5,14] The most commonly reported job types in our study (construction, moving jobs, and painting) reflect the 2008 Bureau of Labor Statistics pattern for foreign-born workers and previous findings from studies with similar populations.[18,27,36] It should be noted that the job category *construction* used in the SHILOS survey included many tasks (laying concrete floors, framing houses or buildings, laying tile, placing sheetrock, doing roofing work, etc.), a fact that highlights the multiple job tasks and working conditions representing different levels of risk for LDLs. It is clear that in addition to exploring the details of the different job types they report, future studies need to explore in more detail the risks that day laborers confront in the construction industry.

Although most LDLs worked in construction, the range of reported jobs was broad and encompassed a variety of jobs in the service sector. For example, the proportion of LDL who worked in house cleaning occupations locally was lower (61%) than LDLs in the Southwest USA (72%).[6] However, the proportion who reported working in cleaning, hotel, and restaurant jobs at least 'sometimes' was high (~80% combined).

Logistic regression results indicated that higher educational attainment significantly predicted higher odds of injury. We hypothesize that this association may be the result of more educated workers being entrusted with more job responsibilities, or being assigned to the more dangerous job tasks. It is also possible that the educated workers were more willing or able to report incidents of injury. On the surface, this is an anomalous result, as more education typically means greater job mastery or greater safety awareness, but greater job responsibilities may represent greater job risks. It is clear that the role of education on the reported injury experience of day laborers merits further investigation.

Higher odds of reported injury were also associated with specific exposures to loud noises, very cold temperatures at work, and the use of vibrating machinery in the previous year. Lower odds of injury were associated with the use of hard hats in the previous year. As we do not know the specific job assignments associated with these exposures, we cannot make causal inferences about exposures and risk of injury. However, results suggest that reported injury is associated with commonly experienced conditions in the construction sector.

Table 4 Demographic characteristics and summative exposure measures as predictors of likelihood of self-reported work-related injury in the previous year*

	B	SE	Odds ratio	95% CI	P
Independent variables					
Demographic					
Time of residence in the USA†	−0.04	0.03	0.96	(0.92, 1.01)	0.13
Education†	0.13	0.04	1.14	(1.04, 1.24)	0.00
Language: only Spanish‡	0.07	0.29	1.07	(0.61, 1.87)	0.82
Age†	0.02	0.02	1.02	(0.99, 1.05)	0.26
Time working as a day laborer†	0.02	0.04	1.02	(0.94, 1.10)	0.68
Marital status‡	−0.50	0.30	0.61	(0.34, 1.09)	0.10
Summative exposure measures					
Total number of jobs†	−0.05	0.08	0.95	(0.82, 1.11)	0.53
Total number of job conditions†	0.17	0.06	1.19	(1.07, 1.33)	0.00
Total PPE used†	−0.12	0.06	0.89	(0.80, 1.00)	0.04

Note: *The outcome variable is ever injured at work in the last year (1=yes, 0=no). Results based on non-missing data.
†Continuous variable.
‡Dichotomous variable measured as yes=1 and no=0.

Perhaps the most revealing finding emerged when we estimated the odds of injury associated with the summative exposure measures. The odds of reported injury were not significantly associated with the total number of jobs performed by day laborers. Only the total number of reported hazardous job conditions and total number of PPE used in the previous year significantly predicted reported risk for injury. This finding is more indicative of the risks for injury day laborers confront at work, as they rotate among a variety of jobs and working conditions. Our results seem to indicate that LDLs are not only exposed to specific on-the-job hazards, but to a multitude of risky conditions whose cumulative (and compounding) influence increases their risk for injury. Similarly, even though hard hats have a singular protective effect, it appears that using a variety of PPE at work may be particularly important for occupational injury prevention efforts among LDLs.

Study Limitations

The first limitation is that the systematic sampling procedure limits the generalizability of the results. We adopted this sampling strategy as part of an exploratory rapid needs assessment survey to identify and prioritize health and working conditions of day laborers. The intent of the study was to describe existing local conditions and not to establish causal relationships or to generalize to other populations. However, our findings support conditions previously reported for other groups of LDLs in the USA. These similarities partially validate our findings and provide the basis for conducting a more careful assessment of job exposures in a randomized control trial.

A second limitation of the study was the potential for recall bias among participants asked to report occupational injuries and illnesses for a 12-month period. We suspect that more severe injuries may have been recalled more accurately, while less severe, and perhaps more frequently occurring injuries, may have been underreported. Thus, we may have underreported the actual rate of occupational injuries experienced by day laborers locally.

A third limitation is related to our assessment of PPE use. In our study, LDLs were asked to report their use of all PPE items included in the survey, regardless of whether the PPE was needed for their job. Therefore, it is unknown if employees who reported never using a PPE, were cases where they should have used it but did not, or cases where the PPE was not relevant for their safe job performance. Thus, our unexposed to PPE group may be confounded with workers in jobs where PPE was not needed.

Conclusions

Day laborers in Houston work in a variety of jobs primarily associated with construction, and experience a multitude of risky job conditions across different job types. The results of our study suggest that more educated workers confront or report a higher risk of injury, a finding that deserves closer scrutiny in future studies. The results also suggest that safety programs, specifically tailored to this population, may need to address specific exposures, as well as the multiple exposures associated with their constantly shifting job conditions. To our knowledge, the measurement of multiple exposures constitutes a novel way to assess the risks confronted by LDLs. Workplace interventions and safety-training programs for day laborers could raise awareness of shifting work conditions and associated hazards, empowering these workers to protect their safety at work.

Disclaimer Statements

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Conflicts of interest None.

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