Safety Climate Among Immigrant Latino Residential Construction Workers.

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Abstract:

It is estimated that approximately 2-3 million Latinos make up approximately 30% of the US construction workforce (Burdette, 2004). Historically, the rate of construction related fatalities for Latino workers exceeds the non-Latino workers and is particularly concentrated in small, less than 10 employee companies (Dong, et.al. 2010). By the nature of the industry and firm size a large portion of this workforce is concentrated in the residential workforce and many times perform work in multiple trades, e.g., drywall and framing, or concrete and masonry. A study was conducted gather data on the safety and health climate from a large group of Latino construction workers situated in western North Carolina to determine a sampling of the climate that affects the health and safety of this workforce. Cross-sectional (N=119) baseline demographic data, a physical demands inventory, safety climate data, workplace PP&E, and abusive supervision data was collected and compiled representing a variety of trades, including framing, masonry, roofing, and general labor.

Additional sampling was done through a real-time 21 day phone diary of workers with one or more work-day diary entries (N=90). The work environment reflects a physically demanding and stressful work environment with frequently less than adequate employer provided PP&E and a risk free day being a rare event. Results from the work climate and supervisor relationship reveal that although workers perceive a concern by management for worker safety this is not borne out by actual management actions and the discouraging belief by 90% of the sample population that sometime over the next 12 months they will be injured.

Keywords: Latino construction worker safety, safety climate

1. Introduction

Construction workers have some of the highest occupational injury rates of all U.S. industries. Although construction has dipped below 1000 in the past three years it remains the industry with has the highest number of fatalities of any US industry, over the past decade there were approximatly1200 fatalities per year, and in 2007 the industry had over 135,000 nonfatal recordable occupational injuries and illnesses with an incident rate of 5.4, second highest among all US industries (BLS, 2007). Further, the illness and injury rates reported in the construction industry are likely vast underestimates (Azaroff et al., 2002), especially in the segment represented by non-fatal, immigrant incidents.

This study focuses on Latino workers in residential construction because first, they constitute a sizable percentage of an increasingly ethnic minority, and foreign born

construction workforce, e.g., during 1995 and 1996 Latinos represented 10% of all workers in the construction industry; in 2001 the percentage reached 18% or 1.3 million, and in 2007 it reached 30% or 2.85 million. This represents an increase of more than 300% for the last 12 years (Brunette, 2004). The second reason for this study is that Latinos have been documented as experiencing a higher rates of fatality, injury and illness within the industry (Dong et al., 2010).

There is considerable research directed at determining the reasons for such a large number of fatalities and injuries. The safe management of this workforce is clearly a challenge to all construction professionals, as indicated by a recent report from the Associated General Contractors of America (2008, p. 1) stating, "…nearly ¼ of current construction workforce is Latino … and the number is expected to increase. Latino immigrants are often illegal, illiterate and do not speak English." One line of research that is being pursued is identifying safety climate over a short time period, in the instance of this work 21 days, and compare that to workers perception of safety climate, and management's alignment in support of a safe work environment.

2. Objectives:

This research identified in this paper uses a nine-question modified Safety Climate Measure for Construction Sites instrument in a baseline survey to assess workers perceptions of safety climate and is followed up by daily surveying practices that contribute to safe work climate. Minor instrument modifications were done to allow for ease of language translation and response by participants. To accomplish the goals of the research longitudinal data was obtained from a community-based sample of Latino residential construction workers (n=119) in selected trades, particularly framers, roofers, and general trades, that: 1) delineate work organization characteristics of immigrant Latino residential construction workers, including variation job in structure (i.e., work hours, precariousness), job design (i.e., skill variety, control, psychological demands, hazards exposure), supervisory practices (i.e., power, retaliation, ability to communicate) and safety climate experiences (baseline survey); and 2) documented reporting over of work over a 21 day time period to record well-being, activities, behaviors, and practices.

3. Safety Climate:

The goal of safety climate analysis is to identify the current safety climate with the intent of determining if safety perception has an impact in job site safety (i.e., is reality matching perception), and is it also reflected in safe practices instituted by the collective organization or employer. There is evidence that safety climate can be positively related to safety performance and negatively associated with accidents (Neal and Griffin, 2002), in total there are over 200 publications that have been done on safety climate, over the last 30 years, demonstrating the predictive validity of safety climate as a leading safety indicator (Zohar, 2010). Collective aspects of a desirable

safety climate are evidenced by management's commitment to maintaining a safe site, eliminating unsafe conditions, and mitigating unsafe behaviors by continuous safety and health training. The concept of worker safety climate and how workers perceive the safety climate of their workplace is an ongoing research effort and is frequently measured using this reliable nine question instrument first developed by Dedobbeleer and Beland (1991) who adapted an earlier safety climate instrument developed by Zohar (1980) that focused on management concern, management actions, and risks as components of safety climate. This 'Safety Climate Measure for Construction Sites' instrument was used by Gillan et.al, (2002) to survey the safety climate among 255 construction workers that resulted in a positive assess that union workers perceived and participated in a safer work climate than non-union workers.

Although there is some literature on safety climate among unionized construction workforces little work has been done on the safety climate of Latino construction workers. Therefore this study aims to through the use of a similar nine question component of a larger baseline instrument to assess safety climate and individual and collective (organizational) practices of immigrant Latino workers employed predominantly as roofers, framers, and general laborers within the US residential construction industry.

4. Methodology:

The data for this study are partial results of much broader NIOSH funded research project designed to determine the feasibility of using Computer-Assisted Telephone Survey (CATS) technology to collected daily diary data from Latino residential construction workers (OH009761-01, subproject #647). The project consisted of four distinct data collection components: 1) a baseline interviewer administered survey, 2) a 21-day self-reported daily diary period using CATS technology, 3) a debriefing interview at the end of the 21-day diary period, and 4) a follow-up interview conducted 3 months after completing the 21-day diary period. The current paper uses data from the baseline and the 21-day daily diary entry.

Sample Population

Baseline data were obtained from a non-probability sample of residential construction workers who self-identified as Latino (N=119). The participants were recruited in partnership with Wake Forest University School of Medicine and HOLA of Wilkes County, a 501c3 non-profit organization that serves the Latino communities of Wilkes and surrounding counties in western NC. HOLA staff used a combination of techniques to recruit residential construction workers, including identifying known individuals within existing social networks, snowball, and referral. Criterion for inclusion within the study were; age 18 years or older, Latino (self or parents born in a Latin American country, or self-identified as "Latino" or "Hispanic"), and employment for 35 or more hours per week in construction. There were no exclusion criteria.

Ninety (90) or 75.6% of the one hundred and nineteen (119) study participants completed one or more work-day diary entries (n=90).

Data Collection: The baseline interview assessed stable attributes of the individual (e.g., age, country of origin), occupational characteristics (e.g., years in construction, primary tasks performed in construction), health history (e.g., presence of chronic conditions), and multiple aspects reflecting the organization of work. It took, on average 48 minutes to complete a baseline interview and participants were paid a $15 incentive. The 21-day daily diary focused on daily well-being, job tasks, injury/accidents, general safety climate, general safety behavior, psychological workload, abusive supervision, and the use of personal protection equipment. The duration of the call-ins varied based on the individual responses and subsequent as-needed follow-up questions. Participants received between $50-$100 incentives for their levels of completing the 21 day call-in cycle. The follow-up interview focused primarily on experiences of injury and changes in health during the preceding 3 month period. The follow-up interview took 24 minutes, on average, to complete, and participants received a $25 incentive. All recruitment and data collection activities were approved by a federally authorized Institutional Review Board (FWA #00001435).

Baseline content and follow-up interviewer-administered survey questionnaires underwent thorough translation and back-translation procedures. Content from validated Spanish instruments was used without modification where they were available. English-only instruments and items developed for this project were translated into Spanish by a native Spanish-speaker. All items were then back translated into English by a fluent Spanish-speaker. Discrepancies identified in the back translation were corrected through consensus and incorporated into both the Spanish and English versions of questionnaires (Behling & Law, 2000).

Baseline survey questionnaire data were collected by trained native Spanish-speaking interviewers. Training consisted of a thorough review of study purpose, screening and recruitment procedures, line-by-line review of the interviewer-administered questionnaires, and progressively more realistic practice interviews. The daily dairy data was collected using the CATS technology over a 21-day period following rolling acceptance into the program. All analyses were performed using SAS v9.2 (SAS Institute, Cary, NC), and used a Type I error rate of 0.05.

5. Results:

In general the median age of a residential Latino construction worker in western NC is 32 (31.7 SD=7.6), years old, and has a relatively staple residency approaching 10 (9.7 (SD=6.0) years, is married or living as married (63.3%), yet is living away from their spouse (90%). Nearly one-quarter of the sample (22.4%) reported having completed an apprenticeship and worked an average of 38.3 weeks (SD=16.9) in construction in the previous year, averaging of 42 hours per week (SD=8.6). The work environment

reflects a physically demanding and stressful work environment with frequently less than adequate PP&E provided by the employer and a risk free day being a rare event.

As evidenced by the data in Table 1, Latino residential construction workers' perception of their employers' commitment to safety, in many ways, are quite favorable. Approximately 70% of workers report "Workers' safety practices are very important to management" and that "Proper safety equipment is always available" Over 70% of workers report "Workers are regularly made aware of dangerous work practices or conditions" and almost 80% state that "Workers have almost total control over personal safety."

However, in several other ways the results from Table 1 identify a contradiction between reality and worker perceptions, One-third or less of workers reported "Workers are regularly praised for safe conduct," or "Workers receive instructions on safety when hired," and "Workers attend regular safety meetings." An even more telling statistic and a startling prediction of safety reality is that less than one half (40.3%) of workers reported that their boss or supervisor does "… as much as possible to make my job safe" and the vast majority (84%) agree or strongly agree that "the possibility of being injured at work in the next 12 months is very likely." This dichotomy may lead one to believe that either the Latino workforce has a low expectation for an employer's responsibility to provide a safe worksite or that there is a high level of organizational loyalty from Latino workers.

Table 2 identifies substantial variation in adherence to safety principals: being risk free is a rare event for some work practices, e.g., Ladder Safety Risks where, on average, only 2.6% of the observed work days were "risk free," while it occurs regularly for others, e.g., Attended a Daily Safety Meeting which was reported on 45% of observed work days. Overall, the majority of the observed work days were not "risk free," in fact there were no days reported without a carry related safety risk for any participant. In general, the patterns of "risk free" days follow what you would expect from self-reported scores on the safety climate.

Specifically identifiable from the study is that roofers have the lowest perceptions of supervisor's commitment to safety, both on several individual items and on the total score. In most cases, the trend is that individuals in the low tertile of safety climate scores have the lowest percentage of "risk free" days, while those in the middle and upper tertile have generally higher scores. However, in most cases these differences were not statistically significant, probably because of low power. In two cases, the comparison was statistically significant, and in one case the comparison approached statistical significance. Overall, the pattern of results suggests that the workers appraisals of the safety climate on the job site are predictive of subsequent observed safety behavior at the individual and collective level.

6. Discussion:

Collectively, the pattern of responses seems to suggest that workers generally agree that their employers are conscientious when it comes to safety, i.e., they seem to respond favorably to overall appraisals, BUT the behavioral translation of these appraisals doesn't seem to happen, e.g., things like recognizing safe behavior or providing safety instruction (either upon hire or regular safety meetings). Put differently, the results indicate that workers believe their supervisors are committed to safety, but behaviors suggesting actual commitment to safety are lacking. The contributions of this study must be considered in light of its limitations. First, the patterns that are evident are predictive although they may not be statistically significant indicating that any larger generalizability of the study findings cannot be ascertained because the sample population was small, localized, and recruited using non-probability methods.

More research with larger Latino population sampling is needed. According to Zohar (2010) high level of analysis is also needed that can lead to recognizing patterns that identify relationships among priorities, e.g., production or field leadership vs. safety, and as a result once individuals recognize these patterns the opportunity for safer behaviors will likely be supported, and rewarded thereby improving safety climate and reducing overall injuries and fatalities. One research strategy may be to place particular emphasis on the trades with the lowest safety climate and high Latino representation with the intent to effect an essential reduction in occupational health and safety disparities experienced by immigrant Latino workers. In perspective it's not unexpected and one can go so far as to predict that the trade (roofing) with the lowest safety climate score from the study, is the trade with the highest number of fatalities (34.7/100,000 full-time workers) of all the construction trades (BLS 2010).

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Table 1. Responses (‡) to safety climate items, and summary total, by type of construction worker.

	Sample (n=119)	Framers (n=26)	Roofers (n=35)	General Laborers (n=58)	p-value
	N (%)	N (%)	N (%)	N (%)	
Workers' safety practices are very important to management	83(69.7)	23(88.5)	18(51.4)	42(72.4)	0.0036
Workers are regularly made aware of dangerous work practices or conditions	85(71.4)	20(76.9)	20(57.1)	45(77.6)	0.0837
Workers are regularly praised for safe conduct	35(29.4)	6(23.1)	2(5.7)	27(46.6)	0.0001
Workers receive instructions on safety when hired	37(31.1)	9(34.6)	4(11.4)	24(41.4)	0.0094
Workers attend regular safety meetings	30(25.2)	7(26.9)	3(8.6)	20(34.5)	0.0200
Proper safety equipment is always available	82(68.9)	19(73.1)	21(60.0)	42(72.4)	0.5095
Workers have almost total control over personal safety	93(78.2)	24(92.3)	22(62.9)	47(81.0)	0.0172
Taking risks is not a part of my job	74(62.2)	21(80.8)	9(25.7)	44(75.9)	<0.0001
The possibility of being injured at work in the next 12 months is very likely.	100(84.0)	23(88.5)	29(82.9)	48(82.8)	0.4115
They do as much as possible to make my job safe (†)	48(40.3)	11(42.3)	14(40.0)	23(39.7)	0.9430
	M(SD)	M(SD)	M(SD)	M(SD)	p-value
Summary Score	23.0 (5.3)	24.3(4.8)	19.9(5.6)	24.3(4.7)	0.0001

(‡) individuals who responded "strongly agree" or "agree" versus "disagree" or "strongly disagree". (†) individuals who responded to the question "How much do supervisors seem to care about your safety" with the reported answer over "they could do more to make my job safe" or "they are only interested in doing the job fast and cheaply"

Table 2. Variation in the percentage of observed work days during the diary period that individual and collective safety practices were reported among Latino construction workers.

		Summary Safety Climate Score			
	Sample‡	Low Tertile	Medium Tertile	High Tertile	p-value
	M (SD)	M(SD)	M (SD)	M (SD)	
Individual Safety Practices					
No Ladder Safety Risks	2.6(9.3)	2.0(6.0)	1.3(3.5)	5.2(15.8)	0.2473
No Lift-Related Safety Risks	2.1(6.9)	2.3(7.5)	2.0(7.3)	2.0(5.5)	0.9732
No Carrying-Related Safety Risks**	0(0)				
No Scaffolding-Related Safety Risks	3.6(12.3)	3.7(7.7)	2.0(7.3)	5.6(20.0)	0.5448
No Glove-Related Safety Risks	33.1(26.8)	26.6(28.1)	37.0(23.8)	36.5(28.1)	0.2253
Did Not Do Something Known to be Unsafe	42.2(27.6)	32.8(30.8)	49.6(24.9)	44.5(24.2)	0.0418
Collective Safety Practices					
Attended a Daily Safety Meeting	45.2(28.3)	36.9(31.2)	52.5(25.2)	46.2(26.3)	0.0822
Reported a Safe & Orderly Worksite	10.8(17.9)	11.6(20.3)	13.0(18.5)	6.8(13.3)	0.4138
Had all Necessary Safety Equipment	11.8(21.5)	12.7(22.9)	14.1(23.3)	7.5(16.9)	0.4918
Did Not Need to Use Damaged Equipment	43.7(28.3)	33.1(28.8)	51.7(26.5)	46.7(26.6)	0.0227
Did Not See a Coworker Create an Unsafe Situation	43.6(27.0)	36.5(31.1)	49.0(25.3)	45.5(22.1)	0.1600

‡ Sample consists of participants with one or more work-day diary entries (n=90).

**No days reported without a carry-related safety risk for any participant