

The relationship between workplace justice and self-reported occupational accidents in construction employees of Taiwan

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Abstract: This study investigated the correlation between workplace justice and self-reported occupational accidents among employees of construction industry in Taiwan, and data from a national survey of employees in 2013 was analyzed. This study sampled a total of 1,543 employees age 25 to 65 in the construction industry, among whom 1,379 were men and 164 were women. Information regarding the experience of work-related accidents occurring over the previous 12 months prior to the survey was obtained by a standardized questionnaire. Also obtained were participants' employment conditions, self-reported health, job demands as well as workplace justice. The prevalence rates of occupational accidents in man and women were 22.84% and 13.41%, respectively. Under controlling participants' employment conditions, self-reported health and job demands there was higher rate of occupational accidents among male construction employees with lower workplace justice. This study provides directions for occupational safety and health interventions.

Key words: Workplace justice, Construction, Employee, Job demands, Occupational accidents

The construction industry encompasses the “construction industry” and “civil engineering industry”, both devoting to the building, renovation, and repair of architectural and civil engineering works, and the “other specialized construction industry”, which is devoted to specialized tasks in construction works. Construction projects are high-risk, labor- and capital-intensive, involve unstable sources of personnel and materials, and depend on workers' accumulated experience and techniques. In the construction industry, production time is long and subcontracting is a detailed

process. Subcontracts vary widely, and competitive bids are the primary method of obtaining business. The construction industry is influenced by government policies and the promotion of major public works projects. The industry is recognized as an economic driver¹). Construction-related occupational hazards include accidents and diseases, and are a crucial safety and health concerns in several industrialized countries. According to statistics by the International Labour Organization (ILO), there are more than 2.78 million deaths and some 374 million non-fatal work-related injuries resulting in more than 4 d of absences from work per year. Studies have found that, on the individual level, occupational accidents not only increase medical costs, but also cause indirect costs such as loss of labor force and

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increased cost of living. On the society level, the overall economic losses from occupational accidents are approximately 1.8% to 6% of gross domestic product (GDP)²⁾. In addition, whether work-related commuting accidents are a kind of occupational accidents is still controversial in different countries³⁾. The occupational accidents in construction industry is an issue of paramount importance to Taiwan, a developing economy in East Asia⁴⁾.

Workplace justice, also called organizational justice in the literature⁵⁻⁸⁾, refers to whether workers are treated fairly, honestly, and justly in their workplaces^{9, 10)}. According to Moorman, workplace justice can be divided into the dimensions of distributive justice, procedural justice, and interactional justice⁹⁾, and interactional justice can be further divided into interpersonal justice and informational justice. The concept of distributive justice originated from sociological theories¹⁰⁾ and refers to whether workplace feedback and distribution methods of rewards, resources, and results are fair¹¹⁾. Procedural justice refers to whether the processes and standards used to determine policies are fair^{7, 11)}. Studies have proposed that in procedural justice the consistency rule, bias-suppression rule, accuracy rule, correct ability rule, representativeness rule, and ethicality rule must be considered for different time-space contexts. Interactional justice focuses on the quality of interpersonal treatment that workers receive when performing their duties and includes two dimensions: first, interpersonal justice, which signifies whether management can consider the viewpoints of their subordinates without involving their personal preferences, and respectfully and fairly handle the affairs of subordinates; second, informational justice, which represents whether relevant information is promptly and honestly communicated to workers during task execution^{5, 9)}.

In a review of the literature regarding occupational accidents in Taiwan and other countries, we identified characteristics of high-risk groups. Most studies have indicated that male workers are at a higher risk for occupational accidents than women, which may be due to differences in occupational exposure risk, safety or health behaviors, and alertness between the genders¹²⁾. Other research findings suggest that gender is unrelated to occupational accident risk¹³⁾. Numerous studies have indicated that in unstable employment relationships, occupational safety training is more often neglected, or workers are less experienced and tend to perform high-risk tasks; these workers often cannot be assigned to safer projects after injury, and are more prone to occupational accidents¹⁴⁾. Self-evaluated health and psychological demand of work are also found being

related to occupational accidents^{15, 16)}.

The literature review revealed that studies on workplace justice have mostly been limited to its correlation with health, work performance, and management satisfaction^{6, 8)}. No studies on the correlation between workplace justice and occupational accidents in workplaces in the construction industry have been performed. However, as the mentioned above, workplace justice emphasizes that workers should be treated fairly, honestly and justly in workplaces. Logically speaking, the higher the rate of workplace justice is, workers can trust in the working environment more, and the atmosphere of the entire workplace will be better. As a consequence, chances are that the risk of occupational accidents will be lower. Therefore, this study examined the correlation between workplace justice and occupational accidents among construction industry workers in Taiwan.

The source of research data was the Institute of Labor, Occupational Safety and Health, Ministry of Labor. Since 1994, a survey of "Employee Perceptions of Safety and Health in the Work Environment" has been conducted every 3 yr. One version of the survey addresses employees, and another version addresses employers and self-employed workers. The survey data collection in this study was conducted in collaboration with the March 2013 "Manpower Survey" conducted by the Directorate General of Budget, Accounting and Statistics. The study participants were employed people in all counties and cities in Taiwan, and stratified two-stage random sampling was used. A total of 28,677 questionnaires were distributed to employees, employers, and self-employed workers, and 25,480 responses were retrieved, with a valid response rate of 88.9%. This study sampled a total of 1,543 employees in the construction industry aged between 25 and 65 yr, of which 1,379 were men and 164 were women. Interviewers who administered the "Manpower Survey" of the Directorate General of Budget, Accounting and Statistics had received professional training, and the questionnaires were required to be answered by the respondents themselves. Thus, the data of this study were credible. The survey sample was representative of the entire country and served as a basis for inferences with regard to the general situation of employed workers in the Taiwanese construction industry in 2013.

The "psychological demand of work" is one dimension of the "psychosocial job characteristics" developed by Karasek *et al*¹⁷⁾. Information on the Chinese Version of the Job Content Questionnaire (C-JCQ) by Karasek and methods used to measure the reliability and validity of

Table 1. Descriptive statistics of age, working hours, employment relationship, self-evaluated health, psychological demand of work, workplace justice, and occupational accidents of workers employed in the construction industry; categorized by gender

Variable	Men (N=1,379)		Women (N=164)	
	n	%/SD	n	%/SD
Occupational accidents (yes)	315	22.84	22	13.41
Age				
25–34	285	20.67	38	23.17
35–44	414	30.02	45	27.44
45–54	470	34.08	56	34.15
55–65	210	15.23	25	15.24
Working hours				
Fixed day and evening shifts	1,299	95.1	159	96.95
Rotating and graveyard shifts	67	4.9	5	3.05
Missing value	13			
Employment relationship				
Stable	615	45.05	93	57.41
Unstable	750	54.95	69	42.59
Missing value	14		2	
χ^2 value	35.17***		22.62***	
Self-evaluated health				
Favorable	755	54.79	97	59.51
Unfavorable	623	45.21	66	40.49
Missing value	1		1	
χ^2 value	107.89***		9.58**	
Psychological demand of work: mean score (standard deviation)	80.85 (17.33)		74.65 (15.97)	
Low	501	36.33	83	50.61
Moderate	499	36.19	52	31.71
High	379	27.48	29	17.68
χ^2 value	18.13***		19.07***	
Workplace justice: mean score (standard deviation)	87.91 (22.37)		90.21 (22.57)	
Low	435	31.84	39	24.07
Moderate	166	12.15	13	8.02
High	765	56	110	67.9
Missing value	13		2	
χ^2 value	30.27***		2.28	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. SD: Standard deviation.

workplace justice has been reported in other studies^{11, 18}).

This study used SAS version 9.4 to process and analyze data. Descriptive statistics are presented as percentages, means, and standard deviations (SDs). The chi-square test was used for bivariate analysis, and multiple logistic regression was used for multivariate analysis.

Table 1 presents descriptive statistics of the ages, working hours, employment relationships, self-evaluated health and psychological demand of work, workplace justice, and occupational accidents of workers in the construction industry. Among the surveyed men, 750 were in unstable employment relationships (54.92%), and results indicated a mean of 80.85 for psychological demand of work

(SD=17.35) and a mean of 87.91 for workplace justice (SD=22.37). Among the women, 93 were in stable employment relationships (57.41%), and a mean of 74.65 for psychological demand of work (SD=15.97) and a mean of 90.21 for workplace justice (SD=22.57) were determined. Respondents were predominantly aged between 35 and 44 yr (414 men, 30.02%; 45 women, 27.44%) and 45 and 55 yr (470 men, 34.08%; 56 women, 34.15%). Working hours were mostly fixed day and evening shifts (1,299 men, 95.10%; 159 women, 3.05%), and self-evaluated health was predominantly favorable (755 men, 54.79%; 97 women, 59.51%). In the 12 months of employment in the construction industry prior to the survey, 315 men

Table 2. Multiple logistic regression analysis of workplace justice and occupational accidents; controlling employment relationship, self-evaluated health, and psychological demand of work; categorized by gender

Variable	Men (N=1,379)		Women (N=164)	
	OR	(95% CI)	OR	(95% CI)
Workplace justice				
High	1		1	
Moderate	1.02	(0.66, 1.59)	0.82	(0.13, 5.01)
Low	1.54	(1.15, 2.06)**	0.42	(0.10, 1.76)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. OR: odds ratio; 95%CI: 95% confidence interval.

(22.84%) had been injured or suffered from illness due to work, whereas 22 women (13.41%) had been injured or suffered from illness due to work. We conducted a bivariate analysis and found that workplace justice and occupational accidents were correlated for male workers employed in the construction industry; for both men and women, employment relationship, self-evaluated health, and psychological demand of work were associated with occupational accidents.

We then included occupational accidents in the multiple logistic regression model. As shown in the data in Table 2, after controlling for employment relationship, self-evaluated health, and psychological demand of work, the odds of occupational accidents were higher in workplaces with low workplace justice for male workers (odds ratio [OR]:1.54). After controlling for employment relationship, self-evaluated health, and psychological demand of work, workplace justice and occupational accidents were not statistically related for female workers.

In the present study sample of construction industry workers in Taiwan, prevalence of occupational accidents during work in the previous year was 22.84% and 13.41% for men and women, respectively, with a mean of 18.13%. This study also found that for both male and female workers employed in the construction industry, employment relationship, self-evaluated health, and psychological demand of work were correlated with occupational accidents. This finding is consistent with those of previous studies¹⁴⁾. After employment relationship, self-evaluated health and psychological demand of work, an index which measures the psychological strain of workers in workplaces, were controlled, results indicated that occupational accident risk was higher for men with low workplace justice than for those with high workplace justice. This correlation did not apply to women. According to the knowledge of the researchers, the association between low workplace justice and occupational risk among men is a novel discovery. The factors may be associated because male workers em-

ployed in the construction industry are primarily engaged in high-risk outdoor worker that men being rage out more easily than women, to name but a few. If they are not treated fairly, honestly, or justly in the workplace, they may become dissatisfied and occupational accidents may occur. Female workers employed in the construction industry are primarily engaged in indoor duties with a lower risk of occupational accidents; thus, this lower risk of occupational accidents is not correlated with workplace justice.

The limitations of the study were as follows. First, the study was limited by cross-sectional data, and the causal relationship between workplace justice and occupational accidents could not be determined. Additionally, the effect of social choice could not be avoided; employees with histories of occupational accidents may be more likely to have been employed in workplaces with low workplace justice.

Second, although the variables of employment relationship, self-evaluated health, and psychological demand of work were controlled during multivariate regression analysis, the following events that may have contributed to occupational accidents were not controlled: life event factors, firm size, number of working hours, seniority, educational background, and whether workers were on rotational shift work. Therefore, this study may have overestimated the correlation between workplace justice and the occupational accidents of workers.

Third, this study measured workplace justice according to participants' self-evaluations. Validity and reliability of questionnaire items were supported by empirical research; however, results may have been affected by the subjective perceptions of respondents. Additionally, results may have been affected by memory bias, because respondents were required to recall whether they had been injured or experienced illness due to work in the preceding 12 months.

Finally, this study only analyzed workers in the construction industry and did not include contract workers, self-employed workers, and employers in the research

scope; thus, the general ability of the study findings is limited. Despite the aforementioned limitations, the study findings are critical to workplace safety management policies which promote workplace justice in the construction industry, and the sample of this study is representative of workers in the construction industry.

Conflict of Interest

The authors declare no competing interest.

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