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# How do employment types and job stressors relate to occupational injury? A cross-sectional investigation of employees in Japan

K. Sakurai [a], A. Nakata [b,*], T. Ikeda [b], Y. Otsuka [c], J. Kawahito [d]

[a] School of Economics, Nihon University, Tokyo, Japan
[b] School of Health Sciences, University of Occupational and Environmental Health, Kyushu, Japan
[c] Department of Psychology, Hiroshima University, Hiroshima, Japan
[d] Department of Psychology, Fukuyama University, Hiroshima, Japan

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ABSTRACT

*Objective:* This study investigated whether 1) the risk of occupational injury differs among permanent employees and specific types of temporary workers, 2) the risk of occupational injury differs across different employment types depending on the degree of job stressors.
*Study design:* A cross-sectional study design based on self-report survey data.
*Methods:* A total of 36,688 full-time workers (28,868 men and 7820 women; average age = 35.4) were surveyed by means of a self-administered questionnaire. Employment types consisted of permanent employment and two forms of temporary employment: direct-hire and temporary work agent (TWA). Job characteristics including job demands, job control, and social support at work were measured. Occupational injury was measured by asking whether the participant had an injury on the job in the past 12 months that required a medical treatment. To investigate the relationships between employment types, job stressors, and occupational injury, hierarchical moderated logistic regression tests were conducted.
*Results:* High job demands (OR = 1.44) and low job control (OR = 1.21) were significantly associated with an increased risk of occupational injury, while controlling for demographic, life style, health, and occupational factors. In addition, direct-hires (OR = 1.85) and temporary agent workers (OR = 3.26) had a higher risk of occupational injury compared with permanent employees. However, the relationship between employment types and the risk of occupational injury depended on the levels of job demands and job control. Specifically, the magnitude of the relationship between job demands and the risk of occupational injury was substantially greater for temporary work agents than for permanent employees when they reported low levels of job control. Such an interaction effect between job demands and job control on the risk of occupational injury was not observed between permanent employees and direct-hire temporary workers.
*Conclusion:* The current study indicated that temporary workers might be more vulnerable to occupational injury than permanent employees. High levels of job demands and low

* Corresponding author.
E-mail addresses: sakurai.kenji@nihon-u.ac.jp (K. Sakurai), nakataa-tky@umin.ac.jp (A. Nakata).

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levels of job control might also add to temporary workers' risk of occupational injury, particularly for TWAs.



## Introduction

Temporary employment refers to a dependent job in which there is no explicit agreement between the worker and the hiring organization for an open-ended contract.[1] Over the past two decades, the number of temporary workers in the workforce has slowly but gradually increased in Canada, Japan, the USA, and in many parts of Europe.[2,3] Such increases likely reflect organizations' response to the increasingly competitive and unpredictable nature of the marketplace. That is, hiring temporary workers benefits organizations not just because these workers help lower labour costs but also because organizations can downsize or expand the business according to demands of the marketplace.[4]

Despite such economic advantages to organizations, occupational health scholars suggest that temporary employment may have negative consequences on the workers. Among such concern is the possibility that temporary workers have a higher risk of occupational injury compared with permanent employees.[5,6] This is because temporary workers' job tenure is limited, they increase the risk of occupational injury through unfamiliarity with the work environment, and with the employer's safety issues and procedures.[6–8] Additionally, temporary employment is often associated with job insecurity, such as worries about losing the current job and uncertainty over the future job stability.[9] Not surprisingly, temporary workers are extrinsically motivated to work hard, to promote positive employer evaluation, and to increase the chance of attaining a new contract.[10,11] Such performance pressure, however, is known to increase the risk of occupational injury. For example, research has demonstrated that performance pressure is a significant predictor of risk-taking behaviours, as well as occupational injury.[12,13] Moreover, research indicates that temporary workers tend to have lower levels of job control than permanent employees.[15] Low levels of job control, which hinder workers' ability to cope with performance pressures, is also a risk factor of occupational injury.[9,14] Other scholars suggest characteristics of employment relationships between hiring organizations and temporary workers also contribute to increase in the risk of occupational injury. For example, Quinlan and Bohle (2004)[16] suggest that hiring organizations' lack of commitment to a stable workforce hinder communication among workers regarding health hazards, as well as sustainment of safety knowledge. A meta-analytical study has shown that low levels of shared knowledge about safety issues and incidents of occupational injury are positively correlated.[12] Further, temporary workers may be particularly vulnerable to workplace injury not just because of gaps in employment protection but also because of workers' reluctance to exercise their rights. For instance, a qualitative analysis by Underhill and Quinlan (2011)[17] revealed that temporary work agents, a type of temporary workers, were three times more likely than permanent employees and direct-hire workers to let go by the organization after taking a medical leave. As such, many temporary work agents reported that they would endure minor injuries and sickness in order to maintain their current job. Quite possibly, the risk of occupational injury increases if individuals work when they are not physically well. Thus, some characteristics of temporary work arrangements might exacerbate health risks, especially for workers with short employment contracts.

In terms of empirical research examining the relative risk of occupational injury between temporary workers and permanent employees, there has not been a consistent finding. For example, a study based on over 1.5 million Spanish workers found a lower risk of occupational injury among temporary workers than among permanent employees.[18] In contrast, another study of over 8000 workers in Canada found a higher risk of occupational injury for temporary workers than for permanent employees.[19] Furthermore, in a review of thirteen studies, Virtanen et al. (2005)[20] report that seven studies found a significantly higher risk of occupational injury for temporary workers than for permanent employees, whereas the remaining six studies did not find such a difference. Thus, past research found both a higher and a lower risk of occupational injury for temporary workers compared with permanent employees. As the authors discuss below, these inconsistent findings could partly be attributed to the fact that the vast majority of studies did not consider effects of job stressors in their analysis.

According to the job demands–control model (JDC model), it is critical to consider the degree of job demands and job control when investigating occupational health and safety.[21] Job demands are conceptualized as the task requirements at work and involve issues such as demands to work hard, having too much to do, and performance pressures. Job control includes both the workers' authority to make decisions and the breadth of skills that are employed. The JDC model posits that the risk of occupational injury increases as workers are exposed to high levels of job demands. For example, employees with high levels of job demands may have an increased risk of occupational injury due to fatigue or mental exhaustion. Further, low levels of job control, when coupled with high levels of job demands, exacerbate the risk of occupational injury because employees have restricted opportunities for coping with job demands.[22] The JDC model was later expanded to include social support (JDC-S model), acknowledging the need to incorporate social aspects of the work environment.[23] For instance, employees might not be able to exercise job control if the supervisor imposes his/her own rules on the subordinates. The JDC-S model thus suggests that a high level of job demand leads to an increased risk of occupational injury, particularly when they are combined with low levels of job control and social support.