Safety and Health at Work xxx (2017) 1–6

Contents lists available at ScienceDirect

Safety and Health at Work

journal homepage: www.e-shaw.org

Original Article

Safety Climate and Occupational Stress According to Occupational Accidents Experience and Employment Type in Shipbuilding Industry of Korea

Kyung Woo Kim [1], Sung Jin Park [2], Hae Sun Lim [3], Hm Hak Cho [1,*]

[1] Safety and Health Policy Research Bureau, Occupational Safety and Health Research Institute, Korea Occupational Safety and Health Agency, Ulsan, Republic of Korea
[2] Research and Development, Synergic Human Resource, Seoul, Republic of Korea
[3] Safety Research Division, National Disaster Management Research Institute, Ulsan, Republic of Korea

ARTICLE INFO

Article history:
Received 20 February 2017
Received in revised form
1 August 2017
Accepted 2 August 2017
Available online xxx

ABSTRACT

Background: Safety climate and occupational stress are related with occupational accident. The present study tried to identify the differences in safety climate and occupational stress according to occupational accidents experience and employment type (e.g., direct workers and subcontract workers).
Methods: In this study, we conducted a survey using safety climate scale and Korean Occupational Stress Scale and classified the participants into four groups: direct workers working for accident-free departments, direct workers working for accident departments, subcontract workers working for accident-free departments, and subcontract workers working for accident departments for 2 years within the same workplace in the shipbuilding industry.
Results: The direct workers and subcontract workers showed diverse results in subscales of safety climate and occupational stress. This result is supported by existing studies; however, further study is necessary for more supporting evidence and elaborative methodological approach.
Conclusion: The necessity of management for safety climate and psychosocial factor such as occupational stress for both direct workers and subcontract workers as a whole is suggested by this study.

1. Introduction

Safety-related occupational accidents are responsible for a considerable proportion of annual deaths and disabilities, and lead to enormous suffering in the affected individual workers and their families. Such accidents are also highly costly to employers [1]. The 2016 Annual Report published by the Korean Ministry of Employment and Labor reported an occupational accident rate of about 0.5% in 2015, during which 90,129 out of a total of 17,968,931 workers requested medical leave lasting 4 days or longer [2]. Although this accident rate was a slight decrease from 2014 (0.53%), the estimated economic loss from these accidents increased from KRW (Korean won) 19,632,795 million to KRW 20,395,540 million, which suggests an urgent need for improved safety management.

Psychology researchers have long been investigating accident proneness [1], with many studies demonstrating a link between occupational accidents and factors associated with safety behaviors, such as occupational stress, conscientiousness, cognitive failures, emotional stability, and safety-related internal/external control [3]. Zohar [4] defined safety climate as a basic psychological perception that employees share about how safe their work environment is. According to Zohar, safety climate comprises the following eight factors: the importance placed on safety training programs, the management's safety attitude, the impact of safety behaviors on promotion, the degree of risk present in the workplace, the effect of the work pace on safety, the safety manager's status, the impact of safety behaviors on social status, and the safety committee's status. Griffin and Neal [5] also defined safety

* Corresponding author. Safety and Health Policy Research Bureau, Occupational Safety and Health Research Institute, Korea Occupational Safety and Health Agency (KOSHA), 400, Jongga-ro, Jung-gu, Ulsan 44429, Republic of Korea.
E-mail address: hmhak@hanmail.net (H.H. Cho).

2093-7911/$ – see front matter
http://dx.doi.org/10.1016/j.shaw.2017.08.002

Please cite this article in press as: Kim KW, et al., Safety Climate and Occupational Stress According to Occupational Accidents Experience and Employment Type in Shipbuilding Industry of Korea, Safety and Health at Work (2017), http://dx.doi.org/10.1016/j.shaw.2017.08.002

climate as a kind of organizational climate that an individual experiences within the organization. According to Griffin and Neal's definition, safety climate comprises the following five factors: management's values, communication, safety practices, education/training, and safety equipment.

Safety climate is often mentioned as an indicator of safety-related outcomes. Payne et al [6] argued that whenever researchers have identified safety climate as a leading indicator of safety outcomes, it is because they have related a prior measure of safety climate to a later measure of safety outcomes, and inversely they have identified safety climate as a lagging indicator because the previous measure of safety outcome can affect the current safety climate [6]. In other words, safety climate reflects the way the workplace safety policies are currently implemented and executed, and because it can have a direct impact on workers' safety behaviors, it can be used to predict future accidents. Furthermore, safety climate also reflects past safety-related behaviors, their personal consequences, and workers' perceptions of past accidents within the organization. For this reason, many studies compared workers personally affected by workplace accidents with workers unaffected by them within the same period. For example, Brown and Holmes [7] found that workers who had experienced workplace accidents exhibited a significantly lower level of safety concerns and behaviors than did workers who had not, which suggests that safety climate is a lagging indicator.

A similar Korean study was conducted by Kim and Park [8], who defined safety climate as a web of perceptions based on individual workers' personal assessments of workplace safety characteristics, and tested Griffin and Neal's safety [5] climate model in Korea. Yi et al [9] tried to find the components of safety climate using a survey of 210 Korean shipbuilding industry workers. They identified the following components: managerial safety interventions, effectiveness of safety communication, safety education, assessment of physical work environment and potential hazards, colleagues' social support of safety climate, supervisors' supportive environment of safety climate, work pressure, workers' level of involvement, safety competence, and safety rules and procedures. These early safety climate studies focused on the specific organizational level, as the researchers believed that this was sufficient to represent the safety climate of the organization as a whole [10]. More recently, however, a different view has emerged, arguing that subgroups of workers must be distinguished within an organization according to their in-group homogeneity [11].

As mentioned previously, occupational stress is an important contributing factor to workplace accidents. For instance, Clarke [12] has argued that psychological distress has a strong impact on safety outcomes, such as accidents and injuries. Siu et al [13] further reasoned that occupational stress is not ensconced within Western culture; rather, it appears to be a universal problem, including in Asia. Numerous other studies have strongly supported the links of workers' safety outcomes with occupational stress and safety behaviors [14].

According to Kim et al [15], the factors influencing workplace accidents can be divided into environmental and psychological factors, the latter of which are primarily associated with workers' stress. Kim and Ahn [16] argued that stress tends to be accompanied by negative psychological responses such as anxiety and depression, as well as negative physiological responses such as hypertension, cardiovascular acceleration, headache, and diminished awareness. According to researchers, these responses can lead to human errors, which subsequently increase the risk of workplace accidents. Therefore, minimizing workers' stress can be a way of reducing workplace safety accidents.

As for Korean research in terms of safety climate and occupational stress, Lee et al [17] examined the effects of safety culture on safety behaviors and accident rates among train operators. Lee [1] similarly conducted a study of railroad workers to examine the effects of failure in perception, conscientiousness, occupational stress, faith in safety control, and emotional stability on workers' safety behaviors and workplace accidents. However, again, most existing studies have focused on a single subgroup within the organization; few studies have examined safety climate and occupational stress among different subgroups such as direct workers and subcontracted workers.

Nonstandard forms of work such as subcontracting have emerged out of economic priority and uncertainties in the production market owing to changing technologies and regulations. This pressure has, unfortunately, encouraged subcontracted workers, owner-operators, and workers at small-scale workplaces to prioritize economic outcomes over running health and safety programs, regular health and safety risk assessment, safety education/training, and adequate supervision [18,19]. The unstable nature of subcontracted workers' employment further increases their exposure to stress and degenerative disease, as well as job-specific hazards [19]. Furthermore, subcontracted workers tend to have lower wages and inferior employment conditions to direct workers. Korea's shipbuilding industry, despite its key role in the Korea economy, has been particularly beleaguered because of weakening demand in recent years. The industry's plight has forced the consideration of employment restructuring for direct workers. The fact that the industry now employs a large number of subcontractors, coupled with the fact that there remains a considerable wage and benefit gap between direct workers and subcontracted workers, has been attracting a great deal of attention in the Korean society [20]. According to a study by Kim [21], direct workers accounted for only 38.8% (57,785 workers) of the 149,030 workers employed in Korea's shipbuilding industry, with the remaining 61.2% (91,245 workers) being subcontracted workers.

In line with the current direction of safety climate and occupational stress research, the present study aims to identify the differences in safety climate and psychosocial factors such as occupational stress between direct workers and subcontracted workers at the same workplace. The study participants include individuals working for Korea's shipbuilding industry, which is the largest employer of subcontracted workers in Korea. Furthermore, we organized participants into subgroups based on their experience of workplace accidents and employment types (direct/subcontract).

2. Materials and methods

2.1. Participants and data collection

The participants included individuals employed or subcontracted by Korean shipbuilding companies with a minimum of 10,000 workers as of April 2016. A total of 284 study participants were ultimately selected from the pool, including 60 direct workers (21.1%) working for 2-year accident-free departments, 92 direct workers (32.2%) working for departments with a history of accidents within the same period, 59 subcontracted workers (20.7%) working for 2-year accident-free departments, and 73 subcontracted workers (25.7%) working for departments with a history of accidents in the same period. Table 1 shows the demographic data pertaining to the participants' sex and age including group. All participating individuals and departments were selected via random sampling. The survey questionnaires were hand-delivered to the workplace managers by the researcher, which were subsequently distributed to the participants to complete over a 2- to 3-day period (to accommodate the demands of their shift schedules). Upon completion, questionnaires were retrieved by the researcher.

Please cite this article in press as: Kim KW, et al., Safety Climate and Occupational Stress According to Occupational Accidents Experience and Employment Type in Shipbuilding Industry of Korea, Safety and Health at Work (2017), http://dx.doi.org/10.1016/j.shaw.2017.08.002