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Original Article

Developing a Scale for Workers' Psychological Burden from the Perspective of Occupational Safety and Health: The Basic Scale as the First Step

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ABSTRACT

Background: Organizations are pursing complex and diverse aims to generate higher profits. Many workers experience high work intensity such as workload and work pressure in this organizational environment. Especially, psychological burden is a commonly used term in workplace of Republic of Korea. This study focused on defining the psychological burden from the perspective of occupational safety and health and tried to develop a scale for psychological burden.

Methods: The 48 preliminary questionnaire items for psychological burden were prepared by a focus group interview with 16 workers through the Copenhagen Psychosocial Questionnaire II and Mindful Awareness Attention Scale. The preliminary items were surveyed with 572 workers, and exploratory factor analysis, confirmatory factor analysis, and correlation analysis were conducted for a new scale.

Results: As a result of the exploratory factor analysis, five factors were extracted: organizational activity, human error, safety and health workload, work attitude, and negative self-management. These factors had significant correlations and reliability, and the stability of the model for validity was confirmed using confirmatory factor analysis.

Conclusion: The developed scale for psychological burden can measure workers' psychological burden in relation to safety and health. Despite some limitations, this study has applicability in the workplace, given the relatively small-sized questionnaire.

1. Introduction

Organizations today are pursuing complex and diverse aims to generate higher profits. They must constantly change to achieve these ends—namely, by organizing and managing products, work methods, technological innovations, human resource policies, forms of work organization, and so on. Such organizational changes lead to greater work intensity. The increased workload has negative effects on workers' health and safety, including musculoskeletal disorders, psychological distress, fatigue, and accidents, and is a factor that increases absenteeism, presenteeism, staff turnover, and poor quality of work within an organization [1].

The factors giving rise to workers' psychological burdens, described in various terms such as workload, work strain, and work pressure, are also known to impede the implementation of safety behaviors by depleting the resources needed for their implementation [2,3]. Volkoff et al [4] reported that the pressure resulting from work pace affected the health of workers in their 50s and above. Cantin et al [5] found that when driving work became complicated and the workload was high, drivers faced high mental

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load, resulting in poorer work performance including slower reaction times with older drivers exhibiting a greater drop in performance than younger drivers as their workload increased.

Organizations are looking for effective ways to evaluate workload, but many assessment tools are designed to measure only essential features such as mental workload and, thus, provide a divided understanding of the workplace. Moreover, there is a need for a broad approach that goes beyond the traditional concept of workload, distinguishes between physical and mental components, and can encompass the complexity of work activities in diverse environments [1]. According to Zhang and Luximon [6], workload is affected by various psychological, physical, and environmental factors and consists of mental demand, physical demand, temporal demand, performance, effort, and frustration. Workload can also refer to the amount of work that an individual has to perform, but there is a difference between the actual amount of work and the amount of work perceived by the individual. In other words, even if the amount of work is the same, the perceived workload differs among individuals, and the workload may be analyzed into quantitative load (time and amount of work) and qualitative load (difficulty level) [7].

Workload is also treated as one of the stress factors in job stress models; work overload, work complexity, work underload that does not match the worker's level, and other factors are considered to be causes of job stress [8]. The Korean Occupational Stress Scale also treats job demand as one of its subscales, including items such as time pressure, work interruption, increased workload, responsibility, excessive burden, work–home balance, and multitasking [9]. Previous research has traditionally approached the subject matter from a perspective that distinguishes between physical and mental workloads [10]. Physical workload was approached from an angle that deals with the limitations of physical work performance that could affect the health and safety of workers [11,12]. In experimental psychology, mental workload was approached from an angle that identifies cognitive or mental limitations affecting human performance in information processing [13]. Responsibility, uncertainty, time pressure, job interruption, and other factors were added to the physical and mental workload factors, and these factors again serve to increase physical and mental workloads [1]. Physical scales focused on activities responding to stress by assessing criteria such as heart rate and blood pressure. Subjective scales, on the other hand, which provided relatively immediate data based on the assessment of perceived workloads to workers, are considered to be convenient and less expensive and, thus, are found to have higher validity than physical scales [14]. Hart and Staveland [15] noted that such subjective scales are among the most common methods of assessing workloads. Representative scales include the National Aeronautics and Space Administration Task Load Index [14,15], the Subjective Workload Assessment Technique [16], the Workload Profile [16], the Borg CR10 Scale [17], and the Multivariate Workload Index [18].

Psychological burdens such as workload not only impede work performance but also can have a direct impact on the safety of workers through accidents and so forth. Despite this, however, there have not been many attempts to develop an assessment tool for measuring the psychological burdens related to the occupational safety and health of workers. In particular, although "psychological burden" is a commonly used term in the workplace in Republic of Korea, it does not have much currency in the academic field relative to other terms such as workload. Job stress and workload can be interrelated, and there is also a corresponding conceptual overlap between them [19]. However, the present study defines "psychological burden" using a more fine-grained concept than job stress and attempts to develop a scale that can measure it.

According to the Cambridge Dictionary [20], "burden" is defined as "a heavy load that you carry" or "something difficult or unpleasant that you have to deal with or worry about." Because the aim of this study is to develop a scale for psychological burdens affecting occupational safety and health through work accidents and so on, psychological burdens here may be regarded as burdens pertaining to the work directly performed by workers or to other related work. More specifically, excessive work amount, work pace, safety and health conditions related to work, and so on can be deemed determinants of psychological burden. Thus, the present study defines the psychological burden of workers in terms of emotions such as concern, anxiety, uneasiness, and depression felt by workers due to their concerns about the success or failure of their work and their safety, which are affected mainly by the workload and work conditions. This conceptual definition serves as the point of departure for our study.

To develop our psychological burden scale, we reviewed the Copenhagen Psychosocial Questionnaire II (COPSOQ II) [21]—developed by the National Institute of Occupational Health in Denmark to assess the health effects of the psychosocial environment of workers in diverse occupations—and the Korean version of the Mindful Awareness Attention Scale (K-MAAS) [22]. Using these scales as the basis, we revised the questionnaire items to suit our research aims through a focus group interview (FGI) and composed preliminary questionnaire items. The COPSOQ II can be used to carry out a comprehensive assessment of the psychosocial work environment. Therefore, it has recently been widely used in Asian countries, and in Republic of Korea, June and Choi [23] conducted a study on its validity. In particular, the COPSOQ II deals with workload-related questions and psychosocial questions in various industrial fields, including job demands, organizational structure, work–individual interface, health and well-being, and offensive behaviors mentioned in the previous studies. As previously mentioned by Fournier [1], it was judged to be suitable as a basic tool.

In addition, as Kim and Ahn [24] mentioned in their previous study, the ability of workers to concentrate in given work situations is one of the important factors for the prevention of safety accidents. One of the concepts associated with consciousness and attention is the concept of mindfulness. Ludwig and Kabat-Zinn [25] emphasized mindfulness as a critical way to pay attention to what is happening now and turned out that mindfulness training has been shown to help emotional stability and has a positive effect on stress reduction and psychological well-being. And recently, the mindfulness concept helps workers to perform effective actions that are appropriate to their situation in the workplace. Because this can lead to the prevention of work accidents [26], we used the K-MAAS along with the COPSOQ II to prepare preliminary questionnaires to use in the present study. In addition to the exploratory study for the development of the scale, the confirmatory factor analysis tried to confirm the validity of the developed scale.

2. Materials and methods

2.1. Measurement

The version of the COPSOQ II designed for professional use consists of a total of 127 questionnaire items with subscales pertaining to "demands at work," "work organization and job contents," "interpersonal relations and leadership," "work–individual interface," "health and well-being," and "offensive behavior" [21]. The Mindful Attention Awareness Scale (MAAS), as developed by Brown and Ryan [27], is a representative questionnaire for assessing mindfulness, and the version used in Republic of Korea is the K-