A Knowledge-Based Ergonomics Assessment System for WMSD Prevention Using AHP Methodology

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Abstract This research develops a knowledge-based ergonomics assessment system (KBEAS) that measure and predicts the degree of criticality of risk factors related to work-related musculoskeletal disorders (WMSD). Predicting WMSD individual risk level provides critical decision support information to occupational safety and health (OSH) practitioners in the ergonomic analysis. The KBEAS is based on the analytic hierarchy process (AHP) methodology. The current study integrates AHP method with real workplace ergonomics risk data and design web-based system assisting a sensible multi-criteria WMSD related risk factors. The objectives involve knowledge acquisition performed through preliminary study, MSD symptom study, literature analysis, and tacit knowledge analysis and practitioner survey to identify the ergonomics risk factors that include individual, organizational, physical and psychosocial. The application of this system shows that the design of the proposed KBEAS for WMSD risk factors has been validated and gets each risk factors weight easily by using AHP. The study findings showed that 'organizational ergonomics risk factors' is more critical than other factors. The overall prioritization revealed that 'exposure to physical demands' had a priority vector of 26.33%, and it was perceived as the item with the most critical factor. The KBEAS could help the user to make an objective judgement on the subjective description and get the correct result of the ergonomics risk factors.

Keywords Knowledge-based ergonomics assessment system · WMSD AHP · Web-based system

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