GRANT RECIPIENT REPORT

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The objective of this project was to examine the association among hazard recognition, safety risk perception and safety climate among steel manufacturing workers with the aim of identifying factors in the injury/illness pathway that can be intervened to mitigate the likelihood of injuries or illnesses in this industry sector. This study aimed to (1) examine steelworkers' ability to recognize safety-related hazards; (2) examine steelworkers' ability to recognize health-related hazards; (3) evaluate workers' risk perception regarding the likelihood of both safety-related and health-related hazards associated with injuries or illnesses; (4) assess workers' perception of safety climate; and (5) analyze the association among hazard recognition, risk perception and safety climate.

The study utilized a safety climate questionnaire, risk perception tool, and images and videos to evaluate hazard recognition.

Cross-sectional data was utilized with a convenience sample of operators in three facilities of a large steel manufacturing organization in the northeastern United States. A few weeks before administering the questionnaire, the research team met with the plant's operating and safety managers to discuss the scope of the study and the instruments to be utilized. Participants were informed that the survey questions referred to their own perceptions regarding organizational management in general and their co-workers pertaining to safety in the facility. The survey was conducted online and self-administered during work hours in a private area of the company facilities under the guidance of four research assistants who, upon request, helped with any issue related to the survey design or the interpretation of the items.

Safety climate was evaluated using a reduced version of the NOSACQ-50 questionnaire comprised of 30 items categorized into the seven dimensions proposed by Kines et al. All items were responded to using a four-point Likert scale from "strongly disagree" to "agree strongly." The instrument measured workers' perceptions of safety at the management level and at the co-workers' level. Each dimension has three to six questions. Safety climate scores for each dimension were calculated as the mean of all non-missing items and reversing items with negative statements.

Risk perception was assessed in a similar manner to the safety climate, with participants rating their agreement with statements covering dimensions of risk. The 10-item Workers' Risk Perception Dimensional Evaluation survey was used to characterize operators' perceptions of risk in the steel manufacturing facility. The instrument is comprised of nine questions related to dimensions of risk perception. Lastly, a final question was designed to measure the overall magnitude of the perceived risk. The survey was adapted to measure perceptions regarding the risk associated with the plant operation rather than with individual hazards as it is commonly used.

Hazard recognition was evaluated through four case images and two one-minute case videos depicting operations/situations performed in each of the three plants. Plant conditions to be evaluated were either identified during the research team's initial walkthrough or through additional images and videos provided by the company safety director. Images and videos were selected considering situations that represent both safety-related and health-related hazards. Participants were instructed to report as many hazards as they were able to identify in the image/video. No instructions were provided regarding focusing on safety- or health-related hazards.