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Journal articles marked with an asterisk indicate an IWH scientist or adjunct scientist is included in the list of authors.

Ajith MM, Ghosh AK, and Jansz J. Contributing effects of individual characteristics, behavioural and job-related factors on occurrence of mining-related injuries: a systematic review. *Work*. 2022; 71(1):87-117.

<https://doi.org/10.3233/WOR-205227>

Abstract: BACKGROUND: Occupational health and safety (OHS) is a complex system due to its three components, namely human, technological and organizational factors. The interplay between the three systems causes workplace accidents and, subsequently, injuries. The body of research currently available demonstrates a disparity in the focus on contributors that cause mining-related injuries beyond the presence of hazards. OBJECTIVE: The aim of this paper was to systematically review and synthesise peer-reviewed published studies that have investigated whether certain individual characteristics, behavioural factors and job-related factors predict mining-related injuries. METHODS: Databases were searched and peer-reviewed publications from 2004 to 2020 were retrieved and analysed. Only 24 from 3073 identified articles were retained for review and synthesis following careful screening. Most identified studies were either cross-sectional or case-control studies, and they were rated as moderate-to-good quality. RESULTS: The review results showed that there is a diverging view in relation to risk factors that cause mining-related injuries. Some publications suggested that old age, male miners, married miners, less educated miners, less experienced miners, alcohol and drug usage, poor working conditions, poor management or supervision, job dissatisfaction and job stress predict injury events while other studies found contradictory relationships or insignificant statistical associations. CONCLUSIONS: Despite the fact that

studied risk factors have been well-established in other industries, there is a significant gap in mining that needs further examination. It is imperative that health and safety intervention strategies are devised and implemented for vulnerable groups

Bauer GR, Mahendran M, Walwyn C, and Shokoohi M. Latent variable and clustering methods in intersectionality research: systematic review of methods applications. *Social Psychiatry and Psychiatric Epidemiology*. 2022; 57(2):221-237.

<https://doi.org/10.1007/s00127-021-02195-6> [open access]

Abstract: PURPOSE: An intersectionality framework has been increasingly incorporated into quantitative study of health inequity, to incorporate social power in meaningful ways. Researchers have identified "person-centered" methods that cluster within-individual characteristics as appropriate to intersectionality. We aimed to review their use and match with theory. METHODS: We conducted a multidisciplinary systematic review of English-language quantitative studies wherein authors explicitly stated an intersectional approach, and used clustering methods. We extracted study characteristics and applications of intersectionality. RESULTS: 782 studies with quantitative applications of intersectionality were identified, of which 16 were eligible: eight using latent class analysis, two latent profile analysis, and six clustering methods. Papers used cross-sectional data (100.0%) primarily had U.S. lead authors (68.8%) and were published within psychology, social sciences, and health journals. While 87.5% of papers defined intersectionality and 93.8% cited foundational authors, engagement with intersectionality method literature was more limited. Clustering variables were based on social identities/positions (e.g., gender), dimensions of identity (e.g., race centrality), or processes (e.g., stigma). Results most commonly included four classes/clusters (60.0%), which were frequently used in additional analyses. These described sociodemographic differences across classes/clusters, or used classes/clusters as an exposure variable to predict outcomes in regression analysis, structural equation modeling, mediation, or survival analysis. Author rationales for method choice included both theoretical/intersectional and statistical arguments. CONCLUSION: Latent variable and clustering methods were used in varied ways in intersectional approaches, and reflected differing matches between theory and methods. We highlight situations in which these methods may be advantageous, and missed opportunities for additional uses

Busey A, Asfaw A, Applebaum KM, O'Leary PK, Tripodis Y, Fox MP, et al. Mortality following workplace injury: quantitative bias analysis. *Annals of Epidemiology*. 2021; 64:155-160.

<https://doi.org/10.1016/j.annepidem.2021.09.015>

Abstract: PURPOSE: Recent studies have shown increased all-cause mortality among workers following disabling workplace injury. These studies did not account for 2 potentially important confounders, smoking and obesity. We estimated injury-related mortality accounting for these factors. METHODS: We followed workers receiving New Mexico workers' compensation benefits (1994-2000) through 2013. Using data from the Panel Study of Income Dynamics, we derived the joint distribution of smoking status and obesity for

workers with and without lost-time injuries. We conducted a quantitative bias analysis (QBA) to determine the adjusted relationship of injury and mortality. RESULTS: We observed hazard ratios after adjusting for smoking and obesity of 1.13 for women (95% simulation interval (SI) 0.97 to 1.31) and 1.12 for men (95% SI 1.00 to 1.27). The estimated fully adjusted excess hazard was about half the estimates not adjusted for these factors. CONCLUSIONS: Using QBA to adjust for smoking and obesity reduced the estimated mortality hazard from lost-time injuries and widened the simulation interval. The adjusted estimate still showed more than a 10 percent increase for both women and men. The change in estimates reveals the importance of accounting for these confounders. Of course, the results depend on the methods and assumptions used

Celikalp U, Irmak AY, and Ekuklu G. Working conditions and anxiety levels of employees who have to work during the COVID-19 pandemic. *Work*. 2021; 70(4):1047-1055.

<https://doi.org/10.3233/WOR-210643>

Abstract: Background: This study aims to evaluate the anxiety levels of employees by determining the working conditions and protective practices in the workplace of individuals who had to work during the COVID-19 pandemic. Methods: The cross-sectional study was carried out with 801 employees from different sectors who continued to work during the COVID-19 pandemic. Results: The mean age of the employees was 33.1±10.3 years, and 63.4% were male while 46.1% were workers. The GAD-7 anxiety level mean score of the participants was determined as 6.6±5.1. Per this, 25.2% of the participants showed a high tendency to anxiety and 38.5% showed a moderate tendency. A statistically significant difference was found between anxiety level and gender, sector and profession. Besides, there was a statistically significant difference between the perception of workplace risk, the way of transportation to the workplace, the social distance in the workplace, measures taken for COVID-19 in the workplace, and anxiety levels ($p < 0.05$). In the multiple regression analysis, age, gender, work sector, COVID-19 anxiety levels, infection status, knowledge level and life satisfaction levels were determined as effective predictors on common anxiety disorder and explained 23.2% of the developed model variance ($R^2 = 0.232$, $p=0.001$). Conclusion: During the pandemic, it was determined that the anxiety susceptibility levels of the employees were very high and their protective practices against COVID-19 in the workplace were insufficient.

Donnelly R. Precarious work and health: do occupation- and state-specific unemployment rates matter for women and for men? *SSM - Population Health*. 2021; 16:100967.

<https://doi.org/10.1016/j.ssmph.2021.100967> [open access]

Abstract: Precarious work has the potential to undermine workers' health and well-being, and linkages between precarious work and health may depend on contextual measures of unemployment. The present study uses data from the Current Population Survey (CPS; 2001-2019) to examine whether several characteristics of precarious work are associated with self-rated health, with attention to differences in these associations by occupation- and state-specific unemployment rates. Findings indicate that experiences of unemployment, part-time

work, and poor work quality (limited social benefits and low wages) are associated with worse self-rated health for working women and men. Moreover, associations between some measures of precarious work and health are weaker at higher levels of occupation- and state-specific unemployment for men, but not for women. The present study points to precarious work as a chronic stressor for many workers that must be considered within broader economic contexts

Ghasemi R, Abedinlou R, Alimohammadi I, Abolghasemi J, Ebrahimi V, Rahimi J, et al. The relationship between emotional intelligence, personality traits and safety behaviors in metal industries workers: confirmatory factor analysis. *Work*. 2021; 70(3):909-915.

<https://doi.org/10.3233/WOR-213610>

Abstract: Background: Human errors cause accidents in the workplace. Screening workers at employment can prevent future accidents from happening. Two important tools that can be helpful in screening are determining the emotional intelligence score and personality traits score of the workers. Objective: The purpose of this study was to evaluate the relationship between emotional intelligence, personality traits and safety behaviors in metal industries workers. Methods: This is a cross-sectional survey. Confirmatory factor analysis was performed to determine the relationship between the components of emotional intelligence, unsafe behaviors, and personality. To collect data for this study, Five-Factor Goldberg questionnaire, Bar-On Emotional questionnaire and Safety behavior questionnaire were used. The collected data were entered into software (SPSS version 22) and refined. Results: The results of this study showed that there was a significant positive correlation between personality traits, emotional intelligence and safe behaviors (p -value = 0.000). The confirmatory factor analysis showed that personality traits influence safe behaviours. Also, studies have shown that emotional intelligence has a positive effect on safe behaviours. The amount indicators of goodness of fit (GFI), Comparative Fit index (CFI), Tucker-Lewis index (TLI) and root mean square error approximation (RMSEA) were 0.944, 0.970, 0.965 and 0.061, respectively. Conclusions: The results of this study suggest that personality traits and emotional intelligence influence safe behaviours in the workplace. Employers can use these two tools in the employment phase and prevent future human-related accidents.

Hansen V, Pit SW, Fiorentino M, Campion S, Abraham R, Cheng J, et al. Changes in antidepressant medication use in the workplace and sustainable employability: a qualitative study of experiences, strategies and solutions. *Archives of Environmental & Occupational Health*. 2022; 77(1):35-45.

<https://doi.org/10.1080/19338244.2020.1841722>

Abstract: This study explores patients' experiences of how antidepressant medication transition events (ceasing, changing or reducing) affect employment and workplace functioning. An anonymous online survey was conducted with adults who had experienced antidepressant medication transition events (AMTEs). Data were analyzed using a hybrid inductive and deductive thematic analysis approach. While a majority of participants

perceived many positive impacts of antidepressant medication on their workplace functioning, considerable negative effects during AMTEs were reported. Participants provided practical solutions to assist employers, policy and clinicians. Significant and detrimental impact of antidepressant medication changes occurred in the workplace. There is an urgent need to raise awareness of the vulnerability of people during AMTEs and to develop educational and supportive resources to assist clinicians and practitioners to support people during this vulnerable time

Koklonis K, Sarafidis M, Vastardi M, Philippakis S, and Koutsouris D. Managing the intervention costs of musculoskeletal disorders in the hospital workplace. IISE Transactions on Occupational Ergonomics and Human Factors. 2021; 9(1):33-48.

<https://doi.org/10.1080/24725838.2021.1985015>

Abstract: OCCUPATIONAL APPLICATIONS This study demonstrates the applicability of multicriteria tools to solve occupational health and safety (OSH) problems related to cost management in the healthcare sector. To the best of our knowledge, this is the first work in which linear programming and established methods for risk assessment of work-related musculoskeletal disorders (i.e., the Key Item Method) have been combined with the knowledge and experience of the corresponding safety engineer (or OSH auditor or consultant). The ease of implementation of the whole process facilitates its future utilization in working practice without adding an undue burden on existing OSH practices

Lee J, Huang YH, Dainoff MJ, and He Y. Where to focus? Insights from safety personnel and external safety consultants on lessons learned about safety climate interventions: a qualitative approach. Journal of Safety Research. 2021; 79:51-67.

<https://doi.org/10.1016/j.jsr.2021.08.005>

Abstract: Introduction: Safety climate is important for promoting workplace safety and health. However, there is a dearth of empirical research on the effective ways of planning, designing, and implementing safety climate interventions, especially regarding what is going to be changed and improved. To address this gap, the present study sought to extract a comprehensive pool of compiled suggestions for safety climate intervention based on qualitative interviews with professionals in occupational safety and health management from potentially hazardous industries. Method: A series of systematic semi-structured interviews, guided by a comprehensive sociotechnical systems framework, were conducted with company safety personnel (n = 26) and external safety consultants (n = 15) of 21 companies from various industries. The taxonomy of five work system components of the sociotechnical systems approach served as overarching themes, representing different areas of improvement in an organization for occupational safety and health promotion, with an aim of enhancing safety climate. Results: Of the 36 codes identified, seven codes were based on the theme of external environment work system, four were based on the theme of internal environment work system, five were based on the theme of organizational and managerial structure work system, 14 codes were based on the theme of personnel subsystem, and six

were based on the theme of technical subsystem. Conclusions: Safety climate intervention strategies might be most commonly based upon the principles of human resource management (i.e., codes based on the personnel subsystem theme and organizational and managerial structure work system theme). Meanwhile, numerous attributes of external/internal environment work system and technical subsystem can be jointly improved to bolster safety climate in a holistic way. Practical Applications: More systematic and organized management of safety climate would be available when various interrelated codes pertinent to a given context are carefully considered for a safety climate intervention.

Mellifont D. COVID-19 related factors affecting the experiences of neurodivergent persons in the workplace: a rapid review. *Work*. 2022; 71(1):3-12.

<https://doi.org/10.3233/WOR-210811>

Abstract: BACKGROUND: Policy responses to the COVID-19 pandemic offer possibilities to advance social justice. One such prospect is to make workplaces more inclusive of neurodivergence. OBJECTIVE: This research addresses the question of, in what ways might COVID-19 affect the experiences of neurodivergent persons in the workplace? METHODS: Conducting a rapid review, the author has applied thematic analysis to a total of 50 documents comprised of journal articles, news articles, and guides as retrieved from purposive searches of ProQuest Central, ProQuest Newsstream International, Google Scholar, and Google databases. RESULTS: Research results have revealed themes of challenges and opportunities, and sub-themes of accommodating (i.e., remote working, employee recruitment, retainment or advancement and/or access); and diversity and inclusion (i.e., acceptance, empathy and/or ERGs). CONCLUSION: This study has informed a baseline COVID-19-related guide to accommodating and including neurodivergence in the workplace. The review concludes by offering possibilities as to what a COVID-19 inspired 'new normal' might mean for supporting neurodivergent staff (and prospective staff)

Morrison T, Dinno A, and Salmon T. The erasure of intersex, transgender, nonbinary, and agender experiences through misuse of sex and gender in health research. *American Journal of Epidemiology*. 2021; 190(12):2712-2717.

<https://doi.org/10.1093/aje/kwab221>

Abstract: Conflation of the terms and concepts of "sex" and "gender" continues to perpetuate the invisibility of sex and gender minorities and obscure information about the ways in which biological sex and gender affect health. The misuse of sex and gender terms and the sex and gender binaries can yield inaccurate results but also, more importantly, contributes to the erasure of intersex, transgender, nonbinary, and agender health experiences. In this article, we discuss ways in which public health researchers can use sex and gender terms correctly and center the health experiences of intersex, transgender, nonbinary, and agender individuals. This includes promoting sensitivity in approaching sex and gender minority communities, improving survey questions, and collaborating with GSM communities to improve research quality and participant experiences. Improving our

standards for the quality of sex and gender term usage and centering sex and gender minorities in public health research are imperative to addressing the health inequalities faced by sex and gender minorities

Naweed A, Bowditch L, Trigg J, and Unsworth C. Injury by design: a thematic networks and system dynamics analysis of work-related musculoskeletal disorders in tram drivers. *Applied Ergonomics*. 2022; 100:103644.

<https://doi.org/10.1016/j.apergo.2021.103644> [open access]

Abstract: Tram driving is a safety critical task where work-related musculoskeletal disorders (WRMSDs) and injuries are associated with interacting occupational design factors over time. These interactions then carry implications for workforce retention, public safety, workplace relations and supports. To better understand such interactions, this study used thematic networks and system dynamics (causal loop diagrams) analysis with the aim to unearth a global theme underscoring occurrence of WRMSDs, and describe the factors influencing the system dynamics of WRMSD occurrence in tram drivers. Building on earlier work focused on occupational participation, secondary analysis of driver interviews (n = 13) and driving observations (n = 11) produced thematic network and causal loop models of risk factors that highlighted an Injury by Design problem structure as a global theme. Research targeting organisational culture, human factors, and design standards is needed to minimise WRMSDs risk in tram drivers.

Omar R, Anan NS, Azri IA, Majumder C, and Knight VF. Characteristics of eye injuries, medical cost and return-to-work status among industrial workers: a retrospective study. *BMJ Open*. 2022; 12(1):e048965.

<https://doi.org/10.1136/bmjopen-2021-048965> [open access]

Abstract: OBJECTIVE: The aim of this study is to determine the characteristics of eye injuries, medical costs and return-to-work status among industrial workers to provide better vision rehabilitative services. SETTING: Nationwide data from the Social Security Organisation (SOCSO) of Malaysia. PARTICIPANTS: A stratified random sample of workers registered with the SOCSO of Malaysia with documentation of eye injury. PRIMARY AND SECONDARY OUTCOME MEASURES: Characteristics of eye injuries and medical costs related to eye injury (primary) and return-to-work status (secondary). RESULTS: A total of 884 from 8861 case files workplace accidents involving eye injury registered with Social Security Services (SOCSO) were identified. The mean age was 35±10 years and the highest incidence of work-related eye injury occurred in the age group 30-39 years and among Malay ethnics. Males are affected more than females' workers. The highest cause of eye injury was the impact from a moving object excluding falling objects (89.2%) and anterior segment injuries occurred more than posterior segment injuries. The total direct and Indirect medical cost was RM1 108 098.00 (US\$316 599.40) and RM4 150 140.00 (US\$1 185 754.20) for 884 cases. CONCLUSION: The majority of workers suffered from the low level of eye injury. A significant relationship was found between the severity of eye injury and employee work status. The indirect cost of

medical and vision rehabilitation was higher than the direct cost. Awareness and vision rehabilitation programmes at the workplace need to be addressed for better prevention and rehabilitative service

Oude Hengel KM, Burdorf A, Pronk A, Schlunssen V, Stokholm ZA, Kolstad HA, et al. Exposure to a SARS-CoV-2 infection at work: development of an international job exposure matrix (COVID-19-JEM). *Scandinavian Journal of Work, Environment & Health*. 2022; 48(1):61-70.

<https://doi.org/10.5271/sjweh.3998> [open access]

Abstract: OBJECTIVE: This study aimed to construct a job exposure matrix (JEM) for risk of becoming infected with the SARS-CoV-2 virus in an occupational setting. METHODS: Experts in occupational epidemiology from three European countries (Denmark, The Netherlands and the United Kingdom) defined the relevant exposure and workplace characteristics with regard to possible exposure to the SARS-CoV-2 virus. In an iterative process, experts rated the different dimensions of the COVID-19-JEM for each job title within the International Standard Classification of Occupations system 2008 (ISCO-08). Agreement scores, weighted kappas, and variances were estimated. RESULTS: The COVID-19-JEM contains four determinants of transmission risk [number of people, nature of contacts, contaminated workspaces and location (indoors or outdoors)], two mitigation measures (social distancing and face covering), and two factors for precarious work (income insecurity and proportion of migrants). Agreement scores ranged from 0.27 [95% confidence interval (CI) 0.25-0.29] for 'migrants' to 0.76 (95% CI 0.74-0.78) for 'nature of contacts'. Weighted kappas indicated moderate-to-good agreement for all dimensions [ranging from 0.60 (95% CI 0.60-0.60) for 'face covering' to 0.80 (95% CI 0.80-0.80) for 'contaminated workspaces'], except for 'migrants' (0.14 (95% CI -0.07-0.36)). As country differences remained after several consensus exercises, the COVID-19-JEM also has a country-axis. CONCLUSIONS: The COVID-19-JEM assesses the risk at population level using eight dimensions related to SARS-COV-2 infections at work and will improve our ability to investigate work-related risk factors in epidemiological studies. The dimensions of the COVID-19-JEM could also be valuable for other future communicable diseases in the workplace

Shkembi A, Smith LM, and Neitzel RL. Retrospective assessment of the association between noise exposure and nonfatal and fatal injury rates among miners in the United States from 1983 to 2014. *American Journal of Industrial Medicine*. 2022; 65(1):30-40.

<https://doi.org/10.1002/ajim.23305>

Abstract: BACKGROUND: Mining is a significant economic force in the United States but has historically had among the highest nonfatal injury rates across all industries. Several factors, including workplace hazards and psychosocial stressors, may increase injury and fatality risk. Mining is one of the noisiest industries; however, the association between injury risk and noise exposure has not been evaluated in this industry. In this ecological study, we assessed the association between noise exposure and nonfatal and fatal occupational injury rates

among miners. METHODS: Federal US mining accident, injury, and illness data sets from 1983 to 2014 were combined with federal quarterly mining employment and production reports to quantify annual industry rates of nonfatal injuries and fatalities. An existing job-exposure matrix for occupational noise was used to estimate annual industry time-weighted average (TWA, dBA) exposures. Negative binomial models were used to assess relationships between noise, hearing conservation program (HCP) regulation changes in 2000, year, and mine type with incidence rates of injuries and fatalities. RESULTS: Noise, HCP regulation changes, and mine type were each independently associated with nonfatal injuries and fatalities. In multivariate analysis, each doubling (5 dB increase) of TWA was associated with 1.08 (95% confidence interval: 1.05, 1.11) and 1.48 (1.23, 1.78) times higher rate of nonfatal injuries and fatalities, respectively. HCP regulation changes were associated with 0.61 (0.54, 0.70) and 0.49 (0.34, 0.71) times lower nonfatal injury and fatality rates, respectively. CONCLUSION: Noise may be a significant independent risk factor for injuries and fatalities in mining

Tustin AW, Kundu-Orwa S, Lodwick J, Cannon DL, and McCarthy RB. An outbreak of work-related asthma and silicosis at a US countertop manufacturing and fabrication facility. *American Journal of Industrial Medicine*. 2022; 65(1):12-19.

<https://doi.org/10.1002/ajim.23304>

Abstract: BACKGROUND: Outbreaks of severe silicosis have affected workers who fabricate artificial stone countertops. Work-related asthma (WRA) has not been a prominent feature of those prior outbreaks. METHODS: This report describes an outbreak of WRA and silicosis at a facility that manufactures and fabricates chemical-resistant countertops comprised of sand, epoxy resin, and phthalic anhydride (PA), a known respiratory sensitizer. The multi-disciplinary investigation included clinical examinations of workers, an industrial hygiene survey with qualitative and quantitative exposure assessments, and a cross-sectional questionnaire. RESULTS: Engineering controls and personal protective equipment were inadequate. Some workers were exposed to PA or silica above permissible exposure limits established by the Occupational Safety and Health Administration (OSHA). Clinical and epidemiologic investigations identified 16 workers with confirmed or suspected WRA. Two years later, after OSHA began to enforce its new silica standards, 12 workers received medical surveillance for silicosis. Of these 12 workers, four (33.3%) were diagnosed with silicosis based on abnormal chest computed tomography examinations. CONCLUSIONS: Artificial stone countertop workers can develop asthma or silicosis. Risk of asthma may be highest in workers exposed to asthmagens such as PA and epoxy resins while manufacturing the artificial stone material

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