



This Workplace Research Monthly includes the latest peer-reviewed articles, reports and evidence on a range of workplace health and safety, prevention, recovery at work and return to work topics that were published in January 2023 only.

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## Description of Evidence Levels Definitions Used in this Review

1. **Level of Evidence** – Certain study designs are scientifically stronger at answering a question. The scoring hierarchy we provided is presented below.

Level of Evidence	Description
Level 1	Evidence from a systematic review or meta-analysis of relevant studies.
Level 2	Evidence from a randomised controlled trial
Level 3	Evidence from a controlled intervention trial without randomisation (i.e. quasi-experimental).
Level 4	Evidence from a case-control or cohort study.
Level 5	Evidence from a single case study, a case series, or qualitative study.
Level 6	Evidence from opinion pieces, reports of expert committees and/or from literature reviews (scoping or narrative).

2. **Relevance** – Research carried out in Australia or similar countries is most relevant to Australian readers.

Level	Description
A	Study conducted in Australia or the study has been conducted outside Australia but confounders unlikely to affect relevance
B	Study conducted outside Australia and confounders likely to affect generalisability

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## Fostering Work Participation

### Return to Work

*This month we explore how the type of return to work after an industrial accident affects job retention and racial and ethnic disparities in workers' compensation claims rates. We also explore return to work following cardiovascular disease, mental health and musculoskeletal conditions and stroke. In Covid-19 related research we explore the impact of pre-pandemic sick leave diagnoses on the length of Covid-19-related sick leave.*

#### **Prediction model for job retention according to the type of return to work among industrially injured workers in Korea**

**Background:** This study aimed to investigate how the type of return to work after an industrial accident affects job retention. **Methods:** Using data from the panel study of workers' compensation insurance first-third, and hazard ratios (HRs) and 95% confidence intervals were calculated for workers leaving their jobs.

**Results:** The HR leaving their jobs were higher in the "reemployed" compared with that in the "returned to original work," with HR of 2.69 (2.33-3.10). According workers' status, the HRs leaving their jobs were higher among the "reemployed" than among those who "returned to original work." Regular and daily workers' HRs were 1.70 (1.37-2.11) and 3.55 (2.96-4.26), respectively. **Conclusions:** The findings suggest that to increase job retention rate, protection policies for reemployed workers or support for employers who hire reemployed workers should be considered.

**Bae et al. 2023.**

**Journal of Occupational and Environmental Medicine, vol. 65, no. 1.**

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(<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

**Keywords:** Return to work; injuries; industrial injuries; Korea.

**Evidence Level:** 4B

**Link:**

[https://journals.lww.com/joem/Fulltext/2023/01000/Prediction\\_Model\\_for\\_Job\\_Retention\\_According\\_to\\_17.aspx](https://journals.lww.com/joem/Fulltext/2023/01000/Prediction_Model_for_Job_Retention_According_to_17.aspx)

#### **Racial and ethnic disparities in workers' compensation claims rates**

**Background:** Workers of colour experience a disproportionate share of work-related injuries and illnesses (WRIL), however, most workers' compensation systems do not collect race and ethnicity information, making it difficult to monitor trends over time, or to investigate specific policies and procedures that maintain or could eliminate the unequal burden of WRIL for workers of color. The purpose of this study is to apply a Bayesian method to Washington workers' compensation claims data to identify racial and ethnic disparities of WRIL by industry and occupation, improving upon existing surveillance limitations. Measuring differences in risk for WRIL will better inform prevention efforts and target prevention to those at increased risk. **Methods:** To estimate WRIL by race/ethnicity, we applied the Bayesian Improved Surname Geocode (BISG) method to surname and residential address data among all Washington workers' compensation claims filed for injuries in 2013-2017. We then compare worker and injury characteristics by imputed race/ethnicity, and estimate rates of WRIL by imputed race/ethnicity within industry and occupation.

**Results:** Black/African Americans had the highest rates of WRIL claims across all industry and occupational sectors. Hispanic/Latino WRIL claimants also had higher rates than Whites and Asian/Pacific Islanders in almost all industry and occupational sectors. For accepted claims with both medical and non-medical compensation, Bodily reaction/overexertion injuries accounted for almost half of the claims during this reporting period. **Conclusion:** The high rates of injury we report by racial/ethnic categories is a cause for major concern. Nearly all industry and occupation-specific rates of workers' compensation claims are higher for Black/African American and Hispanic/Latino workers compared to Whites. More work is needed to identify work-related, systemic, and individual characteristics.

**Smith et al. 2023.**

**PLoS One, vol. 18, no. 1.**

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**Keywords:** Race; ethnic disparities; workers' compensation; injury; illness.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280307>

### **Barriers and facilitators to return to work following cardiovascular disease: A systematic review and meta-synthesis of qualitative research**

**Background:** Return to work is a key rehabilitation goal, however, people recovering from cardiovascular disease (CVD) often struggle with returning to work. The aim of this study was to conduct a systematic review and meta-synthesis of the existing qualitative evidence on barriers and facilitators to return to work experienced by people with CVD. **Methods:** A systematic literature search was conducted in PubMed, Embase, Web of Science, PsycINFO, Scopus and CINAHL in August 2022. The reference lists of the included articles were searched. The Critical Appraisal Skills Programme was used for quality appraisal and a meta-synthesis was employed. **Findings:** This review includes 15 studies of overall high methodological quality. Barriers covered four themes: physical limitations, psychological and relational factors, the working context and support within health and social care systems. Facilitators were related to five themes: return to normality, enhancing well-being, financial concerns, the working context and support within health and social care systems. **Conclusion:** Our findings highlight that return to work following CVD is a complex process influenced by individual factors, as well as work-related factors, factors in the health and social care systems and social security policies and regulations. To improve return to work, this review illustrates a need for individualised, multidisciplinary and coordinated vocational rehabilitation programmes that accommodate potential barriers to re-employment. Similarly, this review highlights how vocational rehabilitation programmes should ensure individualised information and support early in the rehabilitation process, as well as the importance of engaging relevant stakeholders, such as employers, in making individualised return-to-work plans.

**Andersen et al. 2023.**

**BMJ Open, vol. 13.**

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**Keywords:** Organisation of health services; qualitative research; quality in health care; rehabilitation medicine.

**Evidence Level:** 1A

**Link:** <https://bmjopen.bmj.com/content/13/1/e069091.long>

### **Sustainable return to work for workers with mental health and musculoskeletal conditions**

**Background:** Common mental health and musculoskeletal disorders (CMDs and MSDs) are two of the most significant causes of non-participation in employment amongst working age adults. This case study fills an important gap in the scientific literature on reintegration back to work after sickness absence due to CMDs and MSDs. It particularly examines the return to work (RTW) experiences of sick-listed employees to understand the facilitators and barriers of sustainable RTW. **Methods:** Using a realist evaluation approach within a qualitative inquiry, perceptions of employees were explored to provide in-depth understanding of what, how and under what circumstances sustainable RTW can be enabled for employees absent on a short- or long-term basis. Repeat face-to-face semi-structured interviews were conducted with 22 participants (15 women and 7 men, aged 30-50 years and sick-listed with MSDs and CMDs) who were recruited using purposive sampling. Data was thematically analysed. **Results:** A total of 2 main codes and 5 subcodes were developed and grouped into three theoretical abstractions. As a result of validating the context, mechanism, and outcome configurations with accounts of participants, all three initial theories explaining the most prominent mechanisms that either facilitates or impedes a sustainable RTW for people with CMDs and MSDs were justified. **Conclusions:** Our findings reveal the active role of line managers on the RTW outcomes of returning employees. However, line-manager's competence and ability to effectively support and implement appropriate RTW strategies suited to employees' hinges on working in alignment with key stakeholders and returning employees.

**Etuknwa et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Flexible working; line manager; rehabilitation; return to work; sickness absence management; working conditions-job quality.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1057>

### **Returning to work after stroke: Associations with cognitive performance, motivation, perceived working ability and barriers**

**Background:** To investigate post-stroke return-to-work and its associations with cognitive performance, motivation, perceived working ability, and self-perceived barriers to returning to work. **Design:** Prospective cohort study of a clinical sample. **Methods:** Participants were 77 stroke patients younger than age 69 years. Assessment included a cognitive screening method for stroke patients (CoMet), a questionnaire regarding work-related matters, and a question regarding motivation to return to work. A predictive model of return-to-work was built, and how participants managed in their working life was examined. **Results:** Cognitive performance was significantly connected with returning to work. Three of the 5 individuals who dropped out of working life had cognitive dysfunction. Cognitive performance predicted 80% of those who had not returned and 37% of those who had returned by 6 months after the initial assessment. Self-perceived working ability and barriers predicted 64% of those who had not returned and 78% of those who had returned at the 12-month follow-up. **Conclusion:** Cognitive performance seems to be a crucial predictor of return-to-work post-stroke, but individuals' own evaluations of their working capabilities are also important.

**Saar et al. 2023.**

**Journal of Rehabilitation Medicine, vol. 55.**

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**Keywords:** Stroke; cognitive performance; working ability; return to work.

**Evidence Level:** 4A

**Link:** <https://medicaljournalssweden.se/jrm/article/view/2576>

### **Impact of pre-pandemic sick leave diagnoses on the length of COVID-19-related sick leave: A nationwide registry-based study**

**Background:** The COVID-19 pandemic has caused difficulties and changes in many aspects of people's health and lives. Although infection affected work capacity, during the first wave policies for sick leave due to COVID-19 were unclear. The aim of this study was to investigate the impact of sick leave diagnoses in the year before the COVID-19 diagnosis on sick leave duration due to COVID-19 in a nationwide non-hospitalised population. **Methods:** Data from three Swedish registries were analysed for sick leave commencing between 1 March and 31 August 2020, with a follow-up period of 4 months. Sick leave due to COVID-19 was considered the number of days that sickness benefits were used and included at least one registered COVID-19 diagnosis. Sick leave in the year before COVID-19 diagnosis were categorised into five diagnostic groups and one reference group (participants without prior sick leave). **Results:** The study comprised 8935 individuals who received sickness benefits due to COVID-19 in Sweden during the first pandemic wave (mean age 46.7 years, 67% females, and 24% had diagnoses for sick leave in the year before COVID-19 diagnosis). The duration of sick leave due to COVID-19 was significantly higher in the groups with prior sick leave owing to musculoskeletal system diseases (odds ratio [OR]: 1.08, 95% confidence interval [CI]: 1.01-1.15); respiratory system diseases (OR: 1.22, 95% CI: 1.14-1.31); all other isolated diagnoses (OR: 1.08, 95% CI: 1.03-1.14); and multiple diagnoses (OR: 1.32, 95% CI: 1.21-1.43). **Conclusions:** The results of this nationwide registry-based study indicate that individuals with premorbid conditions are more prone to longer sick leave durations due to COVID-19. Prediction of sick leave duration during the first wave of the COVID-19 pandemic is complex and several factors played a role.

**Abzhandadze et al. 2023.**

**BMC Public Health, vol. 23, no. 195.**

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**Keywords:** Epidemiology; registry-based study; return to work; SARS-CoV-2 infection; sick leave.



**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15115-x>

## Presenteeism and Absenteeism

*This month we explore the relationship between sickness absence and job demands, shoulder lesions, noise perception and working life expectancy and working years lost. In Covid-19 related research we explore the relationship between telework experience and presenteeism*

### **Do different job demands interact as predictors of long-term sickness absence? A register-based follow-up on 55 467 Danish workers**

**Backgrounds:** To assess interactions between combinations of quantitative demands, emotional demands, unclear and contradictory demands, and violence/threats of violence in the prospective association with risk of long-term sickness absence (LTSA). **Methods:** We included 55 467 employees from the 2012, 2014 and 2016 waves of the Work Environment and Health in Denmark (WEHD) survey. We measured the four independent variables in the WEHD survey and assessed risk of LTSA in a national register during 12 months of follow-up. Using Cox proportional hazards models, adjusted for age, sex, educational attainment and job group, we estimated risk of LTSA and assessed deviation from additivity using relative excess risk due to interaction (RERI). **Results:** For combinations of high emotional demands and high quantitative demands (HR 1.50; 95% CI 1.33 to 1.70; RERI 0.06; 95% CI -0.15 to 0.26) and high emotional demands and violence/threats of violence (HR 1.76; 95% CI 1.53 to 2.02; RERI 0.12; 95% CI -0.43 to 0.66) we found no indications of deviations from additive effects in predicting LTSA. For combinations of violence/threats of violence and high quantitative demands (HR 1.90; 95% CI 1.64 to 2.20; RERI 0.36; 95% CI 0.01 to 0.71) and unclear and contradictory demands and high quantitative demands (HR 1.46; 95% CI 1.31 to 1.62; RERI 0.23; 95% CI 0.04 to 0.42) the results indicated an excess risk of LTSA above additivity (ie, superadditivity). **Conclusions:** Participants reporting high quantitative demands combined with either violence/threats of violence or unclear and contradictory demands showed a higher risk of LTSA than expected, indicating superadditivity. Results have implications for preventing negative health effects related to adverse psychosocial working conditions.

**Clausen et al. 2023.**

**Occupational and Environmental Medicine, vol. 80, no. 1.**

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**Keywords:** Epidemiology; longitudinal studies; occupational health; occupational stress; sick leave.

**Evidence Level:** 4B

**Link:** <https://oem.bmj.com/content/80/1/7.long>

### **A prognostic model for predicting the duration of 20,049 sickness absence spells due to shoulder lesions in a population-based cohort in Sweden**

**Background:** Sickness absence duration for shoulder lesion patients is difficult to prognosticate, and scientific evidence for the sick-listing practice is lacking. Our objective was to develop a clinically implementable prediction model for the duration of a sickness absence spell due to shoulder lesions.

**Methods:** All new sickness absence spells due to shoulder lesions (ICD-10-code: M75) issued in the period January 2010-June 2012 that were longer than 14 days were identified through the nationwide sickness absence insurance register. Information on predictors was linked from four other nationwide registers. Piecewise-constant hazards regression models were fitted to predict duration of sickness absence. The model was developed and validated using split sample validation. Variable selection was based on log-likelihood loss ranking when excluding a variable from the model. The model was evaluated using calibration plots and the c-statistic. **Results:** 20 049 sickness absence spells were identified, of which 34% lasted >90 days. Predictors included in the model were age, sex, geographical region, occupational status, educational level, birth country, specialized healthcare at start of the spell, number of sickness absence days in the last 12 months, and specialized healthcare the last 12 months, before start date of the index

sickness absence spell. The model was satisfactorily specified and calibrated. Overall c-statistic was 0.54 (95% CI 0.53-0.55). C-statistic for predicting durations >90, >180, and >365 days was 0.61, 0.66, and 0.74, respectively. **Conclusion:** The model can be used to predict the duration of sickness absence due to shoulder lesions. Covariates had limited predictive power but could discriminate the very long sickness absence spells from the rest.

**Gémes et al. 2023.**

**PLoS One, vol. 18, no. 1.**

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**Keywords:** Sickness; absence; shoulder lesions; Sweden.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280048>

### **Working life expectancy and working years lost among users of part- and full-time sickness absence in Finland**

**Background:** The use of part-time sickness absence (pSA) instead of full-time sickness absence (fSA) is known to increase work participation. Yet, its effect on the total length of working lives remains unclear. We carried out a quasi-experiment to assess the impact of using pSA versus fSA on the length of working lives. **Methods:** We used a register-based 70% random sample of the working-age population living in Finland on 31 December 2007 to (i) form propensity-score-matched groups of users of pSA and fSA and (ii) calculate their working life expectancy (WLE) and working years lost (WYL). We applied the Sullivan method based on daily measured time spent at work and other labor market statuses, followed up over a four-year period until the end of year 2017. The study population consisted of private and public sector employees with SA due to mental and musculoskeletal disorders, ie, the diagnostic groups where pSA has been primarily used. **Results:** Among both genders, the pSA group had a significantly higher WLE at age 30 than the fSA group, with larger differences seen in mental disorders compared to musculoskeletal diseases and in the private versus public sector. Overall, the pSA group had fewer WYL due to unemployment and disability retirement but more expected years working with partial disability benefits than the fSA group. **Conclusion:** Based on beneficial working career effects, the use of pSA instead of fSA should always be recommended for persons with mental or musculoskeletal disorders where feasible.

**Hartikainen et al. 2023.**

**Scandinavian Journal of Work, Environment and Health, vol. 49, no. 1.**

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**Keywords:** Working life expectancy; full-time sickness absence; Finland.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4054>

### **Presenteeism and noise perception at work: A cross-sectional study using association analysis**

**Background:** Presenteeism refers to the presence of a worker at work with reduced performance due to illness, and it is a common public health problem. Exposure to noise during production processes brings risk to workers' health. Objective: To analyze the health profile of workers in the automotive industry and identify the association between noise perception and presenteeism among workers in the Brazilian automotive industry. Design and setting: This was a cross-sectional study utilizing a case study design analyzing the automotive industry in the interior of São Paulo state, Brazil. **Methods:** This study included 306 workers using the Presenteeism Work Limitations Questionnaire protocol. Multiple logistic regression was used for data analysis. **Results:** Male workers with reports of headache, tension, and limited well-being at work, having perceived that noise exposure interferes with productivity, showed a positive association with the occurrence of presenteeism. Physical demand had the highest score in terms of interfering with the presenteeism index. **Conclusion:** Workers' perceptions of noise were associated with presenteeism.

**Tavares et al. 2023.**

**Sao Paulo Medical Journal, vol. 141, no. 1.**

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**Keywords:** Presenteeism; noise; work; performance; health.

**Evidence Level:** 4B

Link: <https://www.scielo.br/j/spmj/a/HSk4vdQS4dQCF698NP4BrNx/?lang=en>

### **Relationship between telework experience and presenteeism during COVID-19 pandemic, United States, March-November 2020**

**Background:** Persons with COVID-19-like illnesses are advised to stay home to reduce the spread of SARS-CoV-2. **Methods:** We assessed relationships between telework experience and COVID-19 illness with work attendance when ill. Adults experiencing fever, cough, or loss of taste or smell who sought healthcare or COVID-19 testing in the United States during March-November 2020 were enrolled. **Results:** Adults with telework experience before illness were more likely to work at all (onsite or remotely) during illness (87.8%) than those with no telework experience (49.9%) (adjusted odds ratio 5.48, 95% CI 3.40-8.83). COVID-19 case-patients were less likely to work onsite (22.1%) than were persons with other acute respiratory illnesses (37.3%) (adjusted odds ratio 0.36, 95% CI 0.24-0.53). Among COVID-19 case-patients with telework experience, only 6.5% worked onsite during illness. **Conclusion:** Telework experience before illness gave mildly ill workers the option to work and improved compliance with public health recommendations to stay home during illness.

**Shafer et al. 2023.**

**Emerging Infectious Diseases, vol. 29, no. 2.**

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**Keywords:** COVID-19; SARS-CoV-2; United States; coronavirus disease; pandemic; presenteeism; productivity; respiratory infections; severe acute respiratory syndrome coronavirus 2; telework; viruses; zoonoses.

**Evidence Level:** 5B

Link: [https://wwwnc.cdc.gov/eid/article/29/2/22-1014\\_article](https://wwwnc.cdc.gov/eid/article/29/2/22-1014_article)

## **Building Employer Capability**

### **Wellness Programs**

*This month we explore the promotion of physical activity among working women and the influence of age on developing workplace health promotion programs and services*

### **Promoting physical activity among working women: The influence of perceived policy effectiveness and health awareness**

**Background:** In recent years, patients with chronic diseases have shown a younger trend due to physical inactivity and irregular lifestyles. Accordingly, the Chinese government has implemented the "National Fitness Program", which aims to enhance people's health by popularizing exercise and a healthy lifestyle. However, women are less physically active than men, and how to appeal to women to devote themselves to fitness activities has become a social concern. **Methods:** Based on the expanded theory of planned behavior (TPB), this study explores the impact of the perceived policy effectiveness and health awareness on physical activity among working women. This study adopted a repeated cross-sectional study method, and each respondent was asked to complete a two-stage survey. The structural model of the extended TPB was tested using sample data from 376 working women in Changsha, China. **Results:** The results show that perceived policy effectiveness and health awareness positively affect actual behavioral control and implementation intention. Among them, perceived policy effectiveness has the most significant impact on implementation intention, followed by health awareness. Furthermore, actual behavioral control and implementation intention mediate the relationship between perceived policy effectiveness/health awareness and physical activity. **Conclusions:** The findings suggest that to promote physical activity among working women, the Chinese government should deepen the implementation of the "National Fitness Program" and raise the public's health awareness.

**Wang et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Health awareness; perceived policy effectiveness; physical activity; working women.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1021>

### **Age influences on lifestyle and stress perception in the working population**

**Background:** Workplace health promotion programs and services offered by insurers may play a fundamental role to foster health/well-being and to prevent chronic diseases. To this end, they should be tailored to companies/employees' requirements and characteristics. In particular, age needs to be taken into account, considering both that young age workers are generally healthy, and that young age is the best period in lifespan to address prevention and instilling healthy behaviors. **Methods:** We employed an anonymous, simple web-based questionnaire (filled out by 1305 employees) which furnishes data regarding lifestyle (nutrition, exercise, smoking, stress, sleep, etc.), some of which were used to build a unique descriptor (Lifestyle Index; 0-100 higher scores being healthier). We considered three subgroups accordingly to age:  $\leq 30$ ; between 30 and 50;  $> 50$  years. **Results:** This study showed age influences lifestyle and stress perception in the working population: the youngest employees (both men and women) presented the worst lifestyle index, particularly in its stress component. This observation may potentially be useful to tailor workplace health promotion programs and to personalize insurance protocols and services offered to employees. **Conclusions:** The practical message of our study is that in healthy young people focusing only on medical parameters (frequently within normal ranges in this cohort), albeit important, may be not sufficient to foster proactive actions to prevent chronic non-communicable diseases in adult life. Vice versa, driving their attention on current behaviors might elicit their proactive role to improve lifestyle, getting immediate advantages such as well-being improvement and the possibility to best manage stress.

**Lucini et al. 2023.**

**Nutrients, vol. 15, no. 2.**

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**Keywords:** Age; exercise; gender; lifestyle; prevention; stress; workplace health promotion.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/2072-6643/15/2/399>

### **Job Design**

*This month we explore the impact of long working hours on mental health. In Covid-19 related research we explore the relationship of teleworking with anxiety symptoms and sleep disturbances and the impact of the workplace, such as home workers and non-home workers on employees return to work*

### **Impact of long working hours on mental health: Evidence from China**

**Background:** Although previous studies have examined the impact of long working hours on mental health in China, they have not addressed the initial value and reverse causality issues. **Methods:** To bridge this gap in the literature, I conducted a dynamic longitudinal analysis to investigate the association between long working hours and the risk of mental illness nationwide. Using three-wave longitudinal data from the China Family Panel Studies conducted in 2014, 2016, and 2018, I adopted dynamic regression models with lagged long working hours variables to examine their association with the risk of mental illness. **Results:** The results indicate that long working hours have positive and significant ( $p < 0.01$  or  $p < 0.05$ ) associations with the risk of mental illness (OR: 1.12~1.22). The effect is more significant for women, white-collar workers, and employees in micro-firms, compared with their counterparts (i.e., men, pink- and blue-collar workers, employees of large firms, and self-employed individuals). **Conclusion:** The results provide empirical evidence of the effects of long working hours on mental health in China, confirming the need to enforce the regulations regarding standard working hours and monitor regulatory compliance by companies, as these factors are expected to improve mental health.

**Ma 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** China; long working hours; mental health; risk of mental illness.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1641>

### **Teleworking is significantly associated with anxiety symptoms and sleep disturbances among paid workers in the COVID-19 era**

**Background:** Due to social distancing during COVID-19, teleworking has spread in Korea. Accordingly, the effects of teleworking on physical and mental health have emerged. **Methods:** We aim to determine the association between teleworking and mental health, including anxiety symptoms and sleep disturbance, in paid workers. The data of paid workers from the Sixth Korean Working Conditions Survey, collected between October 2020 and April 2021, were analyzed. Gender stratification analysis and propensity score matching were performed for variables relevant to sociodemographic and occupational characteristics.

Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) for each sex were analyzed using multivariable logistic regression, adjusting for sociodemographic and occupational characteristics.

**Results:** Among 28,633 participants, analyses were performed for anxiety symptoms (teleworkers vs. non-teleworkers; men: 12.1% vs. 4.9%; women: 13.5% vs. 5.3%) and sleep disturbance (men: 33.6% vs. 21.3%; women: 39.7% vs. 25.3%). In male teleworkers, the AORs for anxiety symptoms and sleep disturbance were 1.86 (95% CI: 1.14-3.04) and 1.52 (95% CI: 1.10-2.11), respectively. In female teleworkers, the AORs for anxiety symptoms and sleep disturbance were 1.66 (95% CI: 1.13-2.43) and 1.65 (95% CI: 1.28-2.14), respectively. **Conclusions:** Our results emphasize the importance of mental health and the need for continuous education and care for teleworkers, given the rapid increase in teleworking.

**Kim et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** COVID-19; anxiety symptom; sleep disturbance; telework.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1488>

### **Workplace impact on employees: A Lifelines Corona Research Initiative on the return to work**

**Background:** A large proportion of the global workforce migrated home during the COVID-19 pandemic and subsequent lockdowns. It remains unclear what the exact differences between home workers and non-home workers were, especially during the pandemic when a return to work was imminent. How were building, workplace, and related facilities associated with workers' perceptions and health? What are the lessons to be learned? **Methods:** Lifelines Corona Research Initiative was used to compare employees' workplaces and related concerns, facilities, work quality, and health in a complete case analysis (N = 12,776) when return to work was imminent. Mann-Whitney U, logistic regression, and Wilcoxon matched-pairs were used for analyses. **Results and conclusion:** Notwithstanding small differences, the results show that home workers had less favourable scores for concerns about and facilities of on-site buildings and workplaces upon return to work, but better scores for work quality and health than non-home workers. However, additional analyses also suggest that building, workplace, and related facilities may have had the capacity to positively influence employees' affective responses and work quality, but not always their health.

**Mobach et al. 2023.**

**PLoS One, vol. 18, no. 1.**

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**Keywords:** Return to work; workplace impact; COVID-19; home workers; non-home workers; pandemic.

**Evidence Level:** 4B

**Link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0279902>

## Shift Work

*This month we explore the relationship between shift work and low back pain and breast cancer risk*

### **Association of low back pain with shift work: A meta-analysis**

**Background:** Shift work (SW) is the main working schedule worldwide, and it may cause sleep disorders, breast cancer, and cardiovascular disease. Low back pain (LBP) is a common problem in the workplace; however, the association between LBP and SW remains unclear. **Methods:** Therefore, we conducted a meta-analysis to determine the association between SW and LBP. This study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The PubMed, Embase, and Web of Science databases using a set of associated keywords were queried. The inclusion criteria were as follows: (1) adult employees hired by a company or organization; (2) SW exposure; and (3) the outcome of LBP according to examination or assessment. **Results:** A total of 40 studies were included that met the inclusion criteria for the meta-analysis. SW was significantly associated with LBP (odds ratio [OR]: 1.31, 95% confidence interval [CI]: 1.18-1.47,  $p < 0.00001$ ). Furthermore, it was observed that LBP was significantly associated with night shift (NS) (OR: 1.49, 95% CI: 1.24-1.82,  $p < 0.0001$ ) but not with rotating shift (RS) (OR: 0.96, 95% CI: 0.76-1.22,  $p = 0.49$ ). Moreover, LBP was significantly associated with SW in health care workers (HCWs) (OR: 1.40, 95% CI: 1.20-1.63,  $p < 0.0001$ ) but not in non-HCWs (OR: 1.19, 95% CI: 0.94-1.50,  $p = 0.14$ ). **Conclusions:** SW was significantly associated with LBP. Furthermore, the subgroup analysis showed that NS, but not RS, was associated with LBP. Compared with SW in non-HCWs, SW in HCWs was significantly associated with LBP.

**Chen et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Health care worker; low back pain; lumbago; meta-analysis; occupational medicine; shift work.

**Evidence Level:** 1A

**Link:** <https://www.mdpi.com/1660-4601/20/2/918>

### **Shift work with and without night shifts and breast cancer risk in a cohort study from Finland**

**Background:** To examine the association of shift work with and without night work with breast cancer among women in the public sector. **Methods:** Using the Finnish Public Sector cohort study (N=33 359, mean age of 40.6 years at baseline), we investigated the associations of shift work and potential confounders with incident breast cancer. Exposure to permanent day work or shift work was defined from first two consecutive surveys from 2000, 2004, 2008 or 2012 and past information on exposure in a subcohort (n=20 786). Incident cases of breast cancer (n=1129) were retrieved from the National Cancer Register and the cohort members were followed to the end of 2016. HR and 95% CI from Cox proportional hazard regression models were calculated. **Results:** Shift work with and without night shifts was not overall associated with breast cancer. When stratified according to age, both shift work without nights (HR 2.01, 95% CI 1.12 to 3.60) and shift work with nights (OR 2.05, 95% CI 1.04 to 4.01) were associated with an increased risk after a period of 10 years or more follow-up among women aged 50 years or older, when adjusted for age, socioeconomic status, children, smoking, alcohol and body mass index. In a subgroup with past information on exposure to shift work, the increased risk by longer exposure to shift work was not significant. **Conclusions:** This study provides support for an increased risk of breast cancer among elderly shift workers. However, insufficient information on exposure and intensity of night work may attenuate the risk estimates.

**Härmä et al. 2023.**

**Occupational and Environmental Medicine, vol. 80, no. 1.**

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**Keywords:** Epidemiology; medical oncology; occupational health; shift work schedule.

**Evidence Level:** 4B

**Link:** <https://oem.bmj.com/content/80/1/1.long>

## Management and Leadership

*In this month's Management and Leadership section we review the contribution of total quality management to occupational safety and health performance and the relationship between health-oriented leadership, gender-differences and job satisfaction.*

### **An empirical study of the contribution of total quality management to occupational safety and health performance in Saudi organizations**

**Background:** Working to ensure a safe and secure work environment for workers and employees has become an essential component of achieving organizational excellence in modern organizations. Occupational safety and health (OSH) programs help in attracting and retaining the workforce and human competencies, thus improving the operational and organizational performance of these organizations. Total quality management (TQM) is a management philosophy adopted by successful organizations to achieve sustainable business performance. **Methods:** This study aims to assess the level of implementation of total quality management and occupational safety and health in Saudi organizations and investigates the relationship between total quality management practices and occupational safety and health performance. Data were collected from a number of random organizations during the period November to December 2021. **Results:** Based on a sample of 99 valid responses, empirical results were obtained through descriptive and advanced statistical analysis, indicating that TQM practices and OHS are highly implemented in Saudi organizations. The statistical results also showed that TQM practices have a significant positive impact on OSH performance in the surveyed organizations. **Conclusions:** The seven TQM fundamental pillars and the five OSH program components can be considered as essential success factors and fundamental pillars for TQM implementation in organizations and for OSH performance improvement. **Aichouni et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Saudi organizations; empirical study; occupational safety and health; total quality management.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1495>

### **Health-oriented leadership, gender-differences and job satisfaction: results from a representative population-based study in Germany**

**Background:** In recent years, the topic of health-oriented leadership (HoL) has often been investigated with health-related outcomes like general health, strain, depression, and anxiety symptoms. In contrast, research which considers the gender of leaders and employees in connection to HoL as well as studies on relationships between HoL and job satisfaction, are scarce. The aim of this paper is to explore the relationships between HoL and health status assessed by employees and leaders, to analyse the relationships between HoL and job satisfaction as a non-health-related outcome for employees and leaders and to examine differences in the assessment of HoL between men and women in a representative dataset of the working population in Germany. **Methods:** Data were collected via an access panel as a cross-sectional survey. The quota sample included 643 German workers (managers and employees). We focused on staff-care as a core component of HoL. Statistical analyses were performed using Pearson correlations and regression analyses as well as t-tests and Mann-Whitney-U-Tests. **Results:** The results showed no significant differences between male and female employees or leaders in assessing HoL. Regarding HoL we found relationships between self-rated health status or job satisfaction, both for the self-rated assessment of leaders and employees. **Conclusions:** Our findings indicate relationships between HoL and well-being as well as job satisfaction at the workplace. For interventions of any kind, the lack of gender effects leaves a wide scope for the implementation of health-promoting measures. In particular, the findings on the relationship between HoL and job satisfaction through leaders' self-assessment could be used for salutogenic approaches to strengthen resources in leadership trainings.

**Lutz et al. 2023.**

**BMC Public Health, vol. 23, no. 105.**

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**Keywords:** Gender differences; health-oriented leadership; healthy leadership; job satisfaction; leadership style; self-rated health status.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15014-1>

## Work Ability

### Employment trajectories until midlife in schizophrenia and other psychoses: The Northern Finland Birth Cohort 1966

**Background:** Psychoses are associated with poor labour market attachment, but few studies have compared schizophrenia (SZ) and other psychoses (OP). Moreover, studies on long-term employment trajectories over individuals' working life courses are lacking. We compared 30 year employment trajectory patterns in a general population sample among individuals with SZ, OP, and those with no psychosis (NP).

**Methods:** Utilising the Northern Finland Birth Cohort 1966, we collected survey data on employment from ages 16 to 45 and detected individuals with register-based history of SZ (n = 62), OP (n = 87), or NP (n = 6464) until age 46. Through gender-specific latent class analyses on annual employment roles, we identified traditional, highly educated, self-employed, delayed and floundering employment trajectories with distinct socioeconomic characteristics. We addressed attrition by conducting weighted analyses.

**Results:** Floundering trajectories were common among individuals with SZ (79% of men, 73% of women) and OP (52% of men, 51% of women). In NP, a traditional employee trajectory was most common in men (31%), and a highly educated trajectory in women (28%). A history of psychosis was associated with heightened odds ratios (ORs; 95% confidence intervals (CIs)) for floundering trajectories in both men (SZ: 32.9 (13.3-81.4); OP: 7.4 (4.0-13.9)) and women (SZ: 9.9 (4.6-21.5); OP: 3.9 (2.1-7.1)) compared to NP.

Weighted analyses produced similar results. **Conclusion:** Most individuals with SZ or OP have floundering employee trajectories reflecting an elevated risk of unemployment and part-time work until midlife. These results indicate the importance of improving labour market attachment during the early phases of psychoses.

**Majuri et al. 2023.**

**Social Psychiatry and Psychiatric Epidemiology, vol. 58, no. 1.**

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**Keywords:** Employment; follow-up; outcome; psychosis; schizophrenia; trajectory.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00127-022-02327-6>

## Adapting to the Future of Work

### Technology

#### Digital leisure engagement and positive outcomes in the workplace: A systematic literature review

**Background:** The rise of the Internet and information and communication technologies (ICTs) has led to employees spending increasingly more time on non-work-related digital activities at work. A vast literature base exists that is devoted to the potential adverse effect of such activities in the form of cyberloafing.

However, not much is known about the positive outcomes of such activities conceptualized as digital leisure. **Methods:** The present review systematically examines current literature on digital leisure activities and how these contribute to positive outcomes in the workplace. Additionally, possible moderating and mediating variables are investigated. Using the preferred reporting items for systematic reviews and meta-analyses (PRISMA) framework, eight peer-reviewed studies were identified that met inclusion criteria.

**Results:** The results indicate that resource recovery processes and employee well-being, as well as employee productivity are positively associated with digital leisure in the workplace. Age was found to moderate the relationship between digital leisure and self-reported employee productivity, while employee satisfaction was found to mediate the relationship between digital leisure and employee productivity.

**Conclusions:** Future research directions are outlined and implications for the work context are discussed.



Gellmers et al. 2023.

*International Journal of Environmental Research and Public Health*, vol. 20, no. 2.

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**Keywords:** Cyberloafing; digital leisure; employee productivity; employee recovery; employee well-being; systematic review; work and leisure.

**Evidence Level:** 1A

**Link:** <https://www.mdpi.com/1660-4601/20/2/1014>

## Guiding and Supporting Mental Health and Wellbeing

### Mental Health

*This month we explore issues related to mental health in young workers, firefighters and bus drivers. We also explore the linkage between depressive and anxiety disorders with the expected labour market affiliation, job retention and reintegration in people with mental health problems' s and the relationship between objective cognitive functioning and work performance. In Covid-19 related research we investigate occupational related stress of at-risk workers during Covid-19.*

#### **Job retention and reintegration in people with mental health problems: A descriptive evaluation of supported employment routine programs**

**Background:** Striking evidence supports the effectiveness of supported employment (SE) in achieving competitive employment in individuals with mental health problems. Yet, little is known whether SE is effective to maintain employment in individuals at risk of job loss. We aimed to descriptively compare SE for employed clients (SE-retention) and unemployed clients (SE-integration) regarding competitive employment. **Methods:** We used administrative data from January 2017 to October 2021 provided by a vocational rehabilitation center in Switzerland including all individuals ( $\geq 18$  yrs.) with mental health problems who participated either in SE-retention or SE-reintegration. The outcome was the proportion with competitive employment at discharge. Logistic regression was used to assess time trends and to descriptively compare SE-treatments. We used propensity score weighting, including personal, clinical and program-specific information to reduce group differences. **Results:** A total of 556 participants primarily diagnosed with mood/stress-related, schizophrenia and personality disorders were included ( $n = 297$  SE-retention,  $n = 259$  SE-reintegration) with median age 41 years and 57% female gender. The overall weighted comparison favored SE-retention over SE-reintegration OR 4.85 (95%-CI 3.10 to 7.58,  $p < 0.001$ ) with predicted employment of 67.3% and 29.9% for SE-retention and SE-reintegration, respectively. While success for SE-reintegration remained stable over time, SE-retention showed an increase in more recent years. **Conclusion:** SE-retention provides an approach for early work-related support that can prevent labor market exclusion. In contrast, reintegration is likely to require more efforts to achieve employment and may result in less favorable outcomes. It is therefore necessary that further research includes appropriate comparison groups to evaluate the effectiveness of SE-retention programs as well as the economic and individual benefits.

Zürcher et al. 2023.

*Administration and Policy in Mental Health*, vol. 50.

**User License:** Creative Commons Attribution (CC BY 4.0) (<https://creativecommons.org/licenses/by/4.0/>)

**Keywords:** Job maintenance; job retention; mental illness; rehabilitation; reintegration; return to work; supported employment (SE).

**Evidence Level:** 5B

**Link:** <https://link.springer.com/article/10.1007/s10488-022-01227-w>

#### **Psychosocial work factors affecting mental health of young workers: A systematic review**

**Background:** For the general working population, robust evidence exists for associations between psychosocial work exposures and mental health. As this relationship is less clear for young workers, this systematic review aims at providing an overview of the evidence concerning psychosocial work factors

affecting mental health of young workers. **Methods:** The electronic databases used were PubMed, Web of Science, and PsycINFO and were last searched in October 2021. The eligible outcomes included depression-, stress-, burnout- and anxiety-related complaints, and fatigue, excluding clinical diagnoses and suicide-related outcomes. Only studies with workers aged 35 years or younger were included, which reported at least one association between a psychosocial work factor as exposure and a mental health complaint as outcome. Studies had to be in English, German or Dutch. Risk of bias was assessed using an instrument from the National Heart, Lung, and Blood Institute. Data synthesis was conducted using GRADE. **Results:** In total 17 studies were included in this systematic review, including data from 35,600 young workers in total. Across these studies 86 exposure-outcome associations were reported. Nine exposure-outcome associations could be synthesised. The application of the GRADE framework led to one "low" assessment for the association between psychosocial job quality and mental health. The certainty of evidence for the other eight associations in the synthesis was very low. **Conclusions:** The current systematic review disclosed a high degree of uncertainty of the evidence due to conceptually fuzzy outcomes and exposures as well as large heterogeneity between studies.

**van Veen et al. 2023.**

**International Archives of Occupational and Environmental Health, vol. 96.**

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**Keywords:** Mental health; psychosocial work factors; systematic review; young workers.

**Evidence Level:** 1A

**Link:** <https://link.springer.com/article/10.1007/s00420-022-01907-y>

### **Relationship between objective cognitive functioning and work performance among Japanese workers**

**Background:** We aimed to explore the relationship between objective cognitive functioning and work performance among Japanese workers. **Methods:** From February to November 2019, this cross-sectional study enrolled workers aged 18-65 years from 10 companies located in a metropolitan area of Japan. We emailed invitations to participate to employees of companies that had agreed to cooperate with the study. We measured work performance with the question, "How would you rate your performance (compared with your optimum performance) over the past 4 weeks?" Responses were made via a visual analog scale (range: 0-100). Cognitive functioning was assessed using the THINC-integrated tool (THINC-it®). THINC-it® is a brief, objective computerized cognitive assessment battery. Associations between work performance and cognitive functioning tests were examined using logistic regression analysis. **Results:** In total, 353 individuals provided e-consent to participate, of whom 276 were included in the analysis (after omitting those with missing values). The median work performance was used to divide participants into high- (scoring  $\geq 80\%$ ) and low- (scoring  $< 80\%$ ) performing groups. The P-values for trends indicated that association between cognitive domains, such as attention, executive functioning and working memory was significant ( $P < .05$ ). Work performance was significantly associated with cognitive function for the two tests that assess attention, executive functioning, and working memory in general workers.

**Conclusions:** Our results suggest that objective cognitive functioning may be related to work performance. Longitudinal investigations may allow for the establishment of causality.

**Shibaoka et al. 2023.**

**Journal of Occupational Health, vol. 65.**

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**Keywords:** Cognition; mental health; resilience; sleep disorders; work performance.

**Evidence Level:** 4B

**Link:** <https://onlinelibrary.wiley.com/doi/10.1002/1348-9585.12385>

### **Mental health of UK firefighters**

**Background:** Exposure to trauma, high-stress situations, and disrupted sleep are well known risk factors affecting firefighters' mental health. Little is known about the association between firefighters' exposure to fire contaminants and mental health disorders. The UK Firefighter Contamination Survey assessed firefighters' health and capacity for occupational exposure to contaminants. Participants were invited to anonymously complete its 64 questions online. **Methods:** Logistic regression analyses assessed the

associations between self-reported mental health disorders and proxies of contaminant exposure.

**Results:** Results found that firefighters who notice soot in their nose/throat for more than a day after attending fires (Odds Ratio (OR) = 1.8, 1.4-2.4), and those who remain in their personal protective equipment (PPE) for over 4 h after fires (OR = 1.9, 1.2-3.1), were nearly twice as likely to report mental health disorders. Significantly increased odds ratios for all three outcomes of interest (anxiety, depression and/or any mental health disorders) were also found among firefighters who take PPE home to clean. Sleeping problems were reported by 61% of firefighters. These firefighters were 4.2 times more likely to report any mental health disorder (OR = 4.2, 3.7-4.9), 2.9 times more likely to report anxiety (OR = 2.9, 2.4-3.5) and 2.3 times more likely to report depression (OR = 2.3, 1.9-2.8) when compared to firefighters who did not report sleep issues. **Conclusion:** Effective decontamination measures within UK Fire and Rescue Services, together with firefighters' wellness, may play a crucial role in protecting firefighters' mental health.

**Wolffe et al. 2023.**

**Scientific Reports, vol. 13, no.62.**

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**Keywords:** Mental health; firefighters; exposure; trauma.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-022-24834-x>

### **The linkage of depressive and anxiety disorders with the expected labor market affiliation (ELMA): a longitudinal multi-state study of Danish employees**

**Background:** Depressive and anxiety disorders are prevalent among employees in general. Still, knowledge regarding the contribution of these disorders to the dynamics of the labor market in terms of working time, sickness absence, and unemployment is scarce. We aim to quantify the linkage of depressive and anxiety disorders with labor market participation using the expected labor market affiliation method (ELMA), in a large sample of Danish employees. **Methods:** We combined three survey waves on occupational health with six high-quality national registers in N = 43,148 Danish employees, of which the 2012 survey contributed 29,665 person years, the 2014 survey 33,043 person years, and the 2016 survey 35,375 person years. We used the new ELMA method to estimate the multi-state transition probabilities and 2-year expected time in work, sickness absence, and unemployment. Depressive and anxiety disorders were assessed by the Major Depression Inventory and the SCL-ANX4 scales, respectively. We adjusted for multiple variables by applying inverse probability weighting in groups of gender and age.

**Results:** Depressive and anxiety disorders among employees link to reduced labor market affiliation by significantly changed transitions probabilities between the labor markets states, viewed as reduced working time by 4-51 days (in two years), increased time in sickness absence by 6-44 days (in two years), and unemployment by 6-12 days (in two years) when compared to employees without depression or anxiety disorders. The results were most pronounced for women employees and for employees with both depression and anxiety disorders. **Conclusions:** The study reveals detailed insight into what extent depression and anxiety disorders influence the labor market affiliation, in terms of the complex interrelation between working time, sickness absence, and unemployment. The study emphasizes the importance of preventing and handling depressive and anxiety disorders among employees for strengthening work participation.

**Pedersen et al. 2023.**

**International Archives of Occupational and Environmental Health, vol. 96.**

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**Keywords:** Mental disorders; multi-state; sickness absence; unemployment; work.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00420-022-01906-z>

### **The association of job fatigue with mental disorders among bus drivers**

**Background:** Mental disorders are a global problem with growing importance. However, the contribution of work factors to the development of mental disorders is inconclusive. This study aimed to assess the impact of fatigue and job stress on mental disorders in a prospective cohort of bus drivers. **Methods:** The Taiwan

Bus Driver Cohort Study (TBDCS) recruited 1652 bus drivers from a bus company in 2005. Participants self-completed a structured questionnaire in 2007, which included the Demand-Control-Support (DCS) model questions and the Swedish Occupational Fatigue Inventory-Chinese (SOFI-C). Psychiatric care visits and admissions were obtained from the National Health Insurance Research Dataset (NHIRD) from 2003 to 2016 for as a proxy for psychiatric diagnoses. Drivers with a history of psychiatric disorders before the questionnaire survey time were excluded (N=69). During the follow-up period, a new diagnosis with a psychiatric disorder was defined as an event. Cox proportional hazards model was used to estimate the hazard ratio (HR) for new one-set psychiatric disorders, adjusting for age, body mass index, marital status, education, alcohol consumption, smoking, exercise, bus driving experience, shift work, and chronic diseases. **Results:** Among the 896 bus drivers retained for analysis, 85 were newly diagnosed with a psychiatric disorders. DCS score was not associated with the risk of developing a psychiatric disorders, but bus drivers with high SOFI-C scores ( $\geq 5$ ) had an elevated risk for anxiety or mood disorders (HR 3.35, 95% confidence interval 1.23-9.09). **Conclusions:** Among bus drivers, occupational fatigue, as indicated by high a SOFI-C score, might result in an elevated risk of anxiety or mood disorders. Health service organizations should provide recommendations and guidance for drivers with high fatigue levels to avoid anxiety or mood disorders.

**Lin et al. 2023.**

**Scandinavian Journal of Work, Environment and Health, vol. 49, no. 1.**

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**Keywords:** Job fatigue; mental disorders; bus drivers; mental health.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4065>

### **An investigation into occupational related stress of at-risk workers during COVID-19**

**Background:** Nearly all workers and industry sectors have been affected by the ongoing coronavirus disease 2019 (COVID-19) pandemic in some form since March 2020. However, the pandemic-related stressors experienced in the workplace may vary from industry to industry and may have disproportionately affected some workers. This study investigates increased stress levels, stressor events, and other perceptions of stress from at-risk workers during COVID-19. **Methods:** An in-depth work-related stress survey that incorporated many aspects of work, life, work-life balance, and the health of employer-employee relationships was developed with a focus on COVID-19-related stressors. The cross-sectional survey was distributed online through professional networks from October to November 2021. The survey results were statically analyzed using Kruskal-Wallis one-way analysis of variance (ANOVA) after grouping the industry sectors into the four groups to determine trends within these groupings. **Results:** The survey was completed by 670 workers in sectors such as manual labor, business/office service, healthcare, and education. A variety of trends were determined between the occurrence of COVID-19 and work stress which had, in some cases, affected some industry sectors to a larger degree than others. More than 50% of the participants reported experiencing an increased workload since the onset of the pandemic with some sectors, like healthcare, reporting an increased workload more frequently at 80%. Around 55% of respondents believed they could be exposed to COVID-19 in their workplace, ranging from 52% of business/office service workers to 77% of healthcare workers. **Conclusions:** As workplaces navigate past the pandemic, occupational stress should be addressed head-on through workplaces providing expanded resources so as to assure work stress associated with future pandemics are mitigated appropriately. Whether the stressor is associated with irregular shift work or psychosocial aspects (i.e. relying on coworkers), many of these stressors have the possibility to become exacerbated by external factors such as pandemics.

**Gerding et al. 2023.**

**Annals of Work Exposures and Health, vol. 67, no. 1.**

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**Keywords:** COVID-19; SARS-CoV-2; healthcare workers; work-life balance; workload.

**Evidence Level:** 4A

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9834903/>

## Bullying and Harassment

*This month we explore the relationship between bullying, hazing or offensive behaviour, and mental health and leadership quality, and the prediction of bullying at work in the public health sector.*

### **Exposure to bullying or hazing during deployment and mental health outcomes among US Army Soldiers**

**Background:** Workplace bullying is associated with mental disorders and suicidality in civilians, but few studies have examined associations of bullying with these outcomes among military personnel.

**Objective:** To evaluate associations of being bullied or hazed during deployment with major depressive disorder (MDD), intermittent explosive disorder, posttraumatic stress disorder (PTSD), suicidal ideation, and substance use disorder (SUD). **Design, setting, and participants:** This cohort study used data from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) New Soldier Study (NSS; April 1, 2011, to November 30, 2012) and wave 1 of the STARRS Longitudinal Study (STARRS-LS1; September 1, 2016, to April 30, 2018). A computerized survey administered at 3 US Army installations (NSS) and a web/telephone survey (STARRS-LS1) were used to collect data. Data were analyzed from October 11, 2021, to October 28, 2022. The STARRS-LS1 recruited a probability sample of active-duty soldiers and veterans who had participated in Army STARRS baseline surveys while on active duty (weighted response rate, 35.6%). Respondents whose baseline was the NSS and who had deployed to a combat theater at least once were eligible for this study. **Exposures:** Being bullied or hazed during a combat deployment. **Main outcomes and measures:** The primary outcomes were MDD, intermittent explosive disorder, PTSD, and suicidal ideation in the 12 months before STARRS-LS1 and SUD in the 30 days before STARRS-LS1, assessed with items from the Composite International Diagnostic Interview Screening Scales, PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, and Columbia-Suicide Severity Rating Scale. Logistic regression was used to estimate associations of bullying or hazing exposure with the outcomes. **Results:** The 1463 participants were predominantly male (weighted percentage [SE], 90.4% [0.9%]) and had a mean (SE) age of 21.1 (0.1) years at baseline. At STARRS-LS1, 188 respondents (weighted percentage [SE], 12.2% [1.1%]) reported bullying or hazing during deployment. Weighted outcome prevalences were 18.7% (1.3%) for MDD, 5.2% (0.9%) for intermittent explosive disorder, 21.8% (1.5%) for PTSD, 14.2% (1.2%) for suicidal ideation, and 8.7% (1.0%) for SUD. In models that adjusted for baseline sociodemographic and clinical characteristics and other potential traumas, exposure to bullying or hazing was significantly associated with MDD (adjusted odds ratio [aOR], 2.92; 95% CI, 1.74-4.88), intermittent explosive disorder (aOR, 2.59; 95% CI, 1.20-5.59), PTSD (aOR, 1.86; 95% CI, 1.23-2.83), suicidal ideation (aOR, 1.91; 95% CI, 1.17-3.13), and SUD (aOR, 2.06; 95% CI, 1.15-3.70). **Conclusions:** In this cohort study of combat-deployed soldiers, reports of being bullied or hazed during deployment were associated with mental disorders and suicidal thoughts. Recognition of these associations may inform efforts to prevent and address mental health problems among service members.

**Campbell-Sills et al. 2023.**

**JAMA Network Open, vol. 6, no. 1.**

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**Keywords:** Bullying; mental health; hazing; army; US Soldiers.

**Evidence Level:** 4B

**Link:** <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2800721>

### **Prediction of bullying at work: A data-driven analysis of the Finnish public sector cohort study**

**Background:** To determine the extent to which change in (i.e., start and end of) workplace bullying can be predicted by employee responses to standard workplace surveys. **Methods:** Responses to an 87-item survey from 48,537 Finnish public sector employees at T1 (2017-2018) and T2 (2019-2020) were analyzed with least-absolute-shrinkage-and-selection-operator (LASSO) regression. The predictors were modelled both at the individual- and the work unit level. Outcomes included both the start and the end of bullying. Predictive performance was evaluated with C-indices and density plots. **Results:** The model with best predictive ability predicted the start of bullying with individual-level predictors, had a C-index of 0.68 and included 25 variables, of which 6 remained in a more parsimonious model: discrimination at work unit, unreasonably high workload, threat that some work tasks will be terminated, working in a work unit where



everyone did not feel they are understood and accepted, having a supervisor who was not highly trusted, and a shorter time in current position. Other models performed even worse, either from the point of view of predictive performance, or practical useability. **Conclusion:** While many bivariate associations between socioeconomic characteristics, work characteristics, leadership, team climate, and job satisfaction were observed, reliable individualized detection of individuals at risk of becoming bullied at workplace was not successful. The predictive performance of the developed risk scores was suboptimal, and we do not recommend their use as an individual-level risk prediction tool. However, they might be useful tool to inform decision-making when planning the contents of interventions to prevent bullying at an organizational level.

**Ervasti et al. 2023.**

**Social Science and Medicine, vol. 317.**

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**Keywords:** Lasso regression; longitudinal; psychosocial work environment; risk prediction; workplace bullying.

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0277953622008966?via%3Dihub>

### **Workplace bullying, symptoms of anxiety and the interaction with leadership quality - A longitudinal study using dynamic panel models with fixed effects**

**Background:** Workplace bullying has been suggested to increase symptoms of anxiety. A reverse relationship has also been proposed. However, so far only few earlier studies have investigated this topic and the reported associations might partly be explained by unmeasured individual characteristics. In this study, we aim to examine the temporality and directionality between workplace bullying and anxiety symptoms, taking time-invariant characteristics into account. Furthermore, we aim to examine whether leadership quality modifies these associations. **Methods:** We included 13 491 individuals from two nationwide cohort studies in Sweden and Denmark. Using cross-lagged structural equation models (SEM) and dynamic panel models with fixed effects, we examined contemporaneous and lagged associations between self-reported workplace bullying and anxiety. Cohort-specific results were estimated and combined using fixed-effect meta-analysis. **Results:** The cross-lagged SEM models supported contemporaneous and lagged relationships in both directions (from workplace bullying to symptoms of anxiety and vice versa). In contrast, only contemporaneous relationships remained statistically significant and of considerable magnitude in the dynamic panel models with fixed effects. Specifically, exposure to workplace bullying was related to a concurrent increase in anxiety symptoms ( $b=0.61$ , 95% confidence interval 0.32-0.90). No support of interaction with leadership quality was found. **Conclusions:** The results indicate that onset of workplace bullying is associated with an immediate or short-term increase in anxiety symptoms. This study provides novel insights regarding temporal aspects and causal inference of the bullying-anxiety relationship useful for managing psychological hazards and preventing mental illness at work.

**Holmgren et al. 2023.**

**Scandinavian Journal of Work, Environment and Health, vol. 49, no. 1.**

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**Keywords:** Workplace bullying; anxiety; leadership quality.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4060>

### **The prevalence and mental health correlates of exposure to offensive behaviours at work in Hungary: results of a national representative survey**

**Background:** Within the last decades, a substantial number of reports have established bullying behaviours as a severe risk to the health and safety of workers. However, in Hungary, the severity of this issue remains largely unknown. Therefore, the current study aimed to 1) determine the prevalence of offensive workplace behaviours in the Hungarian working population and 2) examine the relationship between exposure to these offensive behaviours and certain mental health indicators. **Methods:** The cross-sectional

analyses of the present study are based on a sample of 13,104 active workers being representative of the Hungarian working population according to gender, age, educational level, and 18 occupational sectors. The mid-length version of the Copenhagen Psychosocial Questionnaire II (COPSOQ II) was used to measure workplace offensive behaviours (bullying, sexual harassment, threats of violence, and physical violence) in the 12 months preceding the survey. Examined mental health correlates included depressive symptomatology (Beck Depression Inventory), functional somatic symptoms (PHQ-15), perceived stress (Perceived Stress Scale), and general well-being (WHO Well-being Index). **Results:** Almost half (48.7%) of the sample reported exposure to some form of offensive behaviour; 37.6% of participants reported occasional-, while 11.1% reported weekly or daily exposure. More women than men were exposed to offensive workplace behaviours, and those targeted the most were individuals aged 18-29 and in companies employing 20-49 employees. Top managers reported the lowest amount of bullying, while unskilled labourers reported the most frequent exposure. A moderately strong relationship was discovered between exposure to workplace offensive behaviours and all indicators of mental health.

**Conclusion:** Workplace bullying was revealed to be a significant public health concern according to this large, representative data set from Hungary. Strategies to reduce the occurrence and impact of these behaviours on employee health should be a priority for occupational health and safety interventions.

**Szusecki et al. 2023.**

**BMC Public Health, vol. 23, no. 78.**

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**Keywords:** Hungary; mental health; offensive behaviours; prevalence; representative sampling; workplace bullying.

**Evidence Level:** 4B

**Link:** <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-14920-0>

## Psychosocial Issues

*This month we explore the psychosocial issues of workplace isolation, loneliness and wellbeing, the protective role of job satisfaction for burnout and the role of psychosocial work conditions as prediabetes risks. In Covid-19 related research we examine employees' sense of community and social support and impacts on self-rated health whilst working from home.*

### **Harmonious passion at work: Personal resource for coping with the negative relationship between burnout and intrinsic job satisfaction in service employees**

**Background:** Research about harmonious passion as a personal resource that can have a protective effect in situations of stress and burnout is scarce but growing. **Methods:** Considering the job demands-resources (JD-R) model, the present study aims to address the above gaps by exploring the moderating role of harmonious passion at work in the relationship between burnout (physical fatigue, cognitive weariness, and emotional exhaustion) and intrinsic job satisfaction. **Results:** The study sample consisted of 748 workers from service organizations (front-line employees) in southern Spain (Mage = 35.51, SD = 10.06, 52% women). Using statistical program R (R Core Team, 2022), the results of the regression models showed the moderating role of harmonious passion on the negative relationships between physical fatigue and intrinsic job satisfaction. In particular, at high levels of physical fatigue, employees with high scores on harmonious passion at work presented higher levels of intrinsic satisfaction compared with employees with low passion at work. That is, although service employees have high levels of physical fatigue, when they are passionate, they still possess satisfaction with their work. **Conclusions:** Therefore, our findings extend the JD-R theory by considering harmonious passion as a motivational resource that reduce feelings of burnout in service employees. Hence, it shows the importance of promoting the autonomous internalization of work, (through, i.e., job enrichment), which allows the development of harmonious passion at work and, therefore, increasing intrinsic job satisfaction.

**Benitez et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Burnout; intrinsic job satisfaction; service organizations; work harmonious passion.

**Evidence Level:** 5B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1010>

### **Workplace isolation, loneliness and wellbeing at work: The mediating role of task interdependence and supportive behaviours**

**Background:** Despite the negative impact of social isolation on wellbeing, research has yet to address how organisations may mitigate the effects of workplace isolation and loneliness. **Methods:** The main objective of the study is to explore the mediating role of task interdependence and supportive behaviours of colleagues on the relationship between workplace isolation on workplace wellbeing. **Results:** A total of 137 volunteers completed a survey assessing workplace isolation, loneliness, task interdependence, supportive behaviours of colleagues and wellbeing at work. SEM analyses supported the negative effects of company isolation on workplace wellbeing. While supportive behaviours had a mediating role, task interdependence did not mediate the relationships between company isolation and loneliness, and wellbeing. **Conclusion:** The findings show that increased opportunities for interpersonal interactions at work through greater task interdependence are not enough to reverse the negative effects of workplace isolation on wellbeing. In contrast, an investment in a supportive environment may reverse the negative effects of workplace isolation on wellbeing, highlighting the importance of a supportive culture.

**D'Oliveira et al. 2023.**

**Applied Ergonomics, vol. 106.**

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**Keywords:** Loneliness; supportive behaviours; task interdependence; wellbeing; workplace isolation.

**Evidence Level:** 5B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0003687022002174?via%3Dihub>

### **Working from home during the COVID 19 pandemic: A longitudinal examination of employees' sense of community and social support and impacts on self-rated health**

**Background:** The COVID 19 pandemic resulted in the introduction of public health measures including mandated and recommended work from home orders to reduce transmission. This provided a unique opportunity to examine sense of community and social support within the workplace and self-rated general health. This paper examines employees' workplace sense of community and social support across one year of the COVID 19 pandemic and associated self-rated general health. **Methods:** Analysis of longitudinal data (October 2020, May 2021, and November 2021) from the Employees Working from Home study conducted in Victoria, Australia during the COVID 19 pandemic was undertaken. Trajectory analyses were used to describe workplace sense of community and social support over time. Multinomial logistic regression was used to determine the associations between demographics, gender, caring responsibilities, and group membership based on the Growth Mixture Modelling. Generalised Mixed Models were used to measure effects of sense of community and social support on self-rated health. **Results:** Increasing sense of community and social support in the workplace resulted in increased self-rated health. Trajectory analysis found two stable and distinct groups for sense of community. Social support varied with time; however, trajectory membership was not dependent on gender or caring responsibilities and had no relationship with return to the office. **Conclusion:** Sense of community and social support in the workplace are important determinants of employees' health, and as such, workplace strategies to improve sense of community and social support are required not only for employees working from home, but also those who have returned to the office, particularly as hybrid work arrangements become more common.

**Graham et al. 2023.**

**BMC Public Health, vol. 23, no. 11.**

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**Keywords:** COVID 19; self-rated general health; sense of community; social support; work from home; workplace.

**Evidence Level:** 4A

**Link:** <https://bmcpublikealth.biomedcentral.com/articles/10.1186/s12889-022-14904-0>

## **Psychosocial work conditions and prediabetes risks: A cross-sectional study in middle-aged men and women**

**Background:** Prediabetes is a condition between diabetes and normoglycemia, and is a state of major health concern, as a large proportion of people with prediabetes are likely to develop diabetes which is associated with high mortality and morbidity. **Methods:** The purpose of this study was to investigate whether adverse psychosocial work conditions, based on the Job Demand-Control-social support model, increases risk for early dysregulated glucose metabolism in 50-64-year-old men and women. Job conditions were measured with the Swedish Demand-Control-Support questionnaire. Impaired glucose metabolism was assessed by an oral glucose tolerance test. Differences between groups were analyzed with Chi-square test and one-way ANOVA with Bonferroni post-hoc test. Odds ratios (OR) and 95% confidence intervals (95% CI) between Job Demand-control-support and prediabetes outcome were calculated with multiple logistic regression. **Results:** Results from an adjusted logistic regression model showed that in men and woman separately, an active work situation (high demands-high control) was associated with significantly lower prediabetes risk (OR 0.657, 95% CI 0.513-0.842). This finding is consistent through all logistic regression models with different levels of adjustments. Further, the current study does not lend support for the hypothesis that work conditions characterized by high demands-low control were associated with dysregulated glucose metabolism in men nor women despite accumulation of many life-style related risk factors in the high strain group. **Conclusions:** In conclusion, we could show that men and women assessing their work conditions as active, had lower risk for prediabetes.

**Schmidt et al. 2023.**

**Scientific Reports, vol. 13, no. 1198.**

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**Keywords:** Psychosocial; prediabetes; normoglycemia; health concerns.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-023-28420-7>

## **Enabling Healthy and Safe Workplaces**

### **Health and Wellbeing**

*In this month's health and wellbeing section we explore health issues of fly-in fly-out workers in the mining industry in Australia, the association of overtime work duration with oral health-related quality of life and how work-nonwork conflict affects remote workers' general health. We also explore the function and employment after total hip replacement in older adults, the influence of onset of disease on exit from paid employment and the association between weekend catch-up sleep and dyslipidemia. In Covid-19 related research we examine occupational factors associated with telemedicine use.*

### **Health and related behaviours of fly-in fly-out workers in the mining industry in Australia: A cross-sectional study**

**Background:** Fly-In Fly-Out (FIFO), which entails travelling mostly from the urban areas to stay and work in remote areas for designated periods and travel back home to spend designated days of leave, has become a common work arrangement in the mining sector globally. This study examined the mental and physical health of FIFO workers and described their health-related behaviours during on-and off-shift periods.

**Methods:** A cross-sectional study was conducted with FIFO workers (N = 216) in the mining industry in Australia who completed an online survey. Paired t-test and McNemer's analysis examined the differences in health-related behaviours during workers' on-and off-shift days. Logistic regression examined the predictors of physical health and psychological distress status of FIFO workers. **Results:** Workers reported longer sleep duration ( $7.5 \pm 1.5$  h vs  $6.3 \pm 1.2$  h,  $p < 0.001$ ) and better sleep quality (78.2% vs 46.3%,  $p < 0.001$ ) during off-shift nights than on on-shift nights. Smoking prevalence was 26.4%, and workers reported smoking a similar number of cigarettes per day during on-and off-shift days. Most workers reported drinking alcohol (86.1%) and more often at risky levels during off-shift than on-shift days (57.9% vs 34.3%,  $p < 0.001$ ). Fruits and vegetable consumption was low but with higher vegetable intake during off-shift days

( $2.8 \pm 1.4$  vs  $2.3 \pm 1.3$  serves,  $p < 0.001$ ). Workers had good physical health status (91.2%), but 71.4% were overweight/obese and 33.4% indicated high levels of psychological distress. Working on long shifts (OR 6.63, 95% CI 1.84-23.91) and smoking (OR 7.17, 95% CI 2.67-19.26) were linked to high psychological distress. **Conclusions:** The prevalence of psychological distress and risky health behaviours was high. Interventions should aim to reduce psychological distress and support multiple behaviour changes, considering FIFO work-related characteristics including long shift hours.

**Asare et al. 2023.**

**International Archives of Occupational and Environmental Health, vol. 96, no. 1.**

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**Keywords:** Australia; FIFO; health behaviours; mining; physical health; psychological distress.

**Evidence Level:** 4A

**Link:** <https://link.springer.com/article/10.1007/s00420-022-01908-x>

### **The influence of onset of disease on exit from paid employment among workers in The Netherlands: A longitudinal register-based study with 9 years follow-up**

**Background:** This study investigates the influence of onset of disease on exit from paid employment and whether this differs across diseases and sociodemographic groups. **Methods:** Register data from Statistics Netherlands on medication prescription was linked to information on employment status and demographics. Persons who were employed in 2009 and 2010 and who did not use medication for the selected disease in 2009 (N=5 889 036) were followed-up over nine years. Six diseases were identified based on medication prescription in 2010 and 2011: cardiovascular diseases, inflammatory diseases, diabetes mellitus, respiratory diseases, common mental disorders, and psychotic disorders. Four pathways out of paid employment were defined: disability benefits, unemployment, no income, and early retirement. Early exit from paid employment was defined as exiting paid employment before retirement age. Cause-specific Cox proportional hazards regression analyses were performed, with interaction terms for age, sex, and migration background. **Results:** Onset of disease increased the likelihood of exit from paid employment, with the strongest associations for psychotic disorders [hazard ratio (HR) 2.88, 95% confidence interval (CI) 2.78-2.98] and common mental disorders (HR 2.00, 95% CI 1.97-2.03). Onset of disease was most strongly associated with disability benefits, followed by unemployment. The influence of common mental and psychotic disorders on disability increased until around middle-age, after which it decreased. The influence of mental health problems on exit from paid employment was stronger for persons with a non-native Dutch background and males. **Conclusion:** Onset of diseases, especially mental health disorders, is a risk for exiting paid employment before the retirement age. Effective interventions are needed to enhance an inclusive workforce and prevent involuntary loss of paid employment.

**Hijdra et al. 2023.**

**Scandinavian Journal of Work, Environment and Health, vol. 49, no. 1.**

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**Keywords:** Disease; paid employment; workers; disease burden; exit.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4064>

### **Association between weekend catch-up sleep and dyslipidemia among Korean workers**

**Background:** Within competitive sociocultural environments, most Korean workers are likely to shorten their sleep duration during the weekday. Short sleep duration is associated with dyslipidemia; however, studies on the correlation between various sleep patterns and dyslipidemia are still lacking. In hence this study aimed to investigate the association between weekend catch-up sleep (CUS) and dyslipidemia among South Korean workers. **Methods:** Our study used data from the 8th Korea National Health and Nutrition Examination Survey (KNHANES). The analysis covered 4,085 participants, excluding those who were diagnosed with dyslipidemia and not currently participating in economic activities. Weekend CUS was calculated as the absolute difference between self-reported weekday and weekend sleep duration. Dyslipidemia was diagnosed based on the levels of total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides in blood samples collected after 9-12 h of fasting. **Results:** After adjusting for sociodemographic, economic, health-related, and sleep-related



factors, a negative association of weekend CUS with dyslipidemia was observed in male workers (odds ratio: 0.76, 95% confidence interval: 0.61-0.95). Further, workers with total sleep duration of 7-8 h, night workers, and white-collar workers with CUS were at relatively low risk of dyslipidemia compared to the non-CUS group. Less than 2 h of weekend CUS was negatively related to dyslipidemia in Korean workers, especially males. **Conclusions:** This suggests that sleeping more on weekends for workers who had a lack of sleep during the week can help prevent dyslipidemia.

**Jang et al. 2023.**

**Scientific Reports, vol. 13, no. 925.**

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**Keywords:** Sleep; sleep duration; dyslipidemia; sleeping patterns; Korea.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-023-28142-w>

### **Function and employment after total hip replacement in older adults: A narrative review**

**Background:** The burden of osteoarthritis (OA) has increased steadily due to an aging population, increasing life expectancy, obesity and lifestyle factors. Total hip replacement has become one of the most prevalent and successful operations globally and it is projected that demand will continue to grow as the incidence of OA continues to increase. Patients undergoing the operation expect much-improved function and pain relief but also increasingly need to return to work postoperatively, especially given the growing demand for the procedure and the encouragement of older people to continue working by most governments in the developed world. **Methods:** This review provides an overview of function and employment outcomes after hip arthroplasty. **Results:** Despite the generally good success rate, some patients do not attain good functional outcomes and it is important that we develop ways to identify these patients preoperatively. We describe the effect of demographic, clinical and other factors on functional outcomes, as well as trajectories of physical function and pain recovery beyond the first few weeks after total hip replacement. Regarding employment outcomes, many people in work preoperatively are likely to resume to work after recovery; however, patients feel that they lack guidance from clinicians about returning to work postoperatively. **Conclusion:** Our review encompasses factors associated with return to work, timing of return to work, and potential temporary or permanent limitations that people might experience at work depending on type of employment.

**Zaballa et al. 2023.**

**Maturitas, vol. 167.**

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**Keywords:** Employment; function; total hip replacement.

**Evidence Level:** 6A

**Link:** [https://www.maturitas.org/article/S0378-5122\(22\)00198-0/fulltext](https://www.maturitas.org/article/S0378-5122(22)00198-0/fulltext)

### **Occupational factors associated with telemedicine use in the Japanese working-age population: A web-based study conducted during the COVID-19 pandemic**

**Background:** Telemedicine has significant potential for helping workers access medical treatment. To improve workers' access to telemedicine, it is important to analyze current utilization rates and influencing factors. Therefore, the purpose of this study is to evaluate the associations between occupational factors and telemedicine use. **Methods:** A 1-year follow-up study of 4,882 full-time workers receiving regular treatment in Japan was conducted from December 2020 to December 2021. Occupational factors associated with the use of telemedicine were evaluated by multivariate logistic regression analysis. **Results:** In total, 191 participants had experience of using telemedicine (3.9%). The most common comorbidity was hypertension (37.0%), followed by back pain and arthritis (19.8%) and depression and psychiatric disorders (14.5%). Managers and executives [adjusted odds ratio (aOR) = 1.92, 95% confidence interval (CI): 1.68-3.43,  $P < 0.026$ ], finance industry workers (aOR = 2.61, 95% CI: 1.24-5.49,  $P = 0.011$ ), and individuals with experience of teleworking (aOR = 2.08, 95% CI: 1.52-2.85,  $P < 0.001$ ) were more likely to use telemedicine. Telemedicine usage was least common among workers aged 50-59 years (aOR = 0.35, 95% CI: 0.22-0.57,  $P < 0.001$ ) and those with long working hours ( $\geq 9.0$  hours/day) (aOR = 0.59, 95% CI: 0.38-0.93,  $P < 0.022$ ). The utilization rate of telemedicine in Japan is still low. **Conclusions:** This study identified occupational factors

related to the use of telemedicine, such as worker's age, employee status, working hours, and experience of teleworking. Our findings suggest that flexible work arrangements could promote widespread use of telemedicine.

**Ueno et al. 2023.**

**The Tohoku Journal of Experimental Medicine, vol. 259, no. 2.**

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**Keywords:** COVID-19; occupational health; telehealth; telemedicine; workers.

**Evidence Level:** 4B

**Link:** [https://www.istage.jst.go.jp/article/tjem/259/2/259\\_2022.J107/\\_article](https://www.istage.jst.go.jp/article/tjem/259/2/259_2022.J107/_article)

### **Association of overtime work duration with oral health-related quality of life in Japanese workers**

**Background:** Overtime work is associated with a risk of developing various diseases, including oral diseases. Oral Health-Related Quality of Life (OHRQoL) is a more comprehensive assessment than those of individual diseases and can be affected by longer working hours. **Methods:** This cross-sectional study examined the association of overtime work duration with OHRQoL. Data were obtained from an online survey of Japanese workers in February 2016. OHRQoL was assessed using the Oral Health Impact Profile-49 (OHIP-49). Poisson regression with robust variance was used to estimate the ratio of means and 95% confidence intervals (CI) of overtime work duration for OHIP-49 scores after adjusting for sociodemographic and health behavior covariates. **Results:** Of 2,764 (2,178 male and 586 female) workers (mean age, 44.6 ± 10.0 years), those with longer duration of overtime work tended to exhibit poorer OHRQoL. The mean OHIP-49 scores of those who did not work overtime and worked for ≥5 h overtime were 27.93 ± 28.53 and 40.97 ± 38.86, respectively. After adjusting for covariates, compared to those who did not work overtime, the mean OHIP-49 score was 1.41 times higher (95% CI 1.38-1.44) for those who worked for ≥5 h overtime.

**Conclusion:** Longer overtime work duration was associated with poor OHRQoL.

**Tanemura et al. 2023.**

**Journal of Oral Sciences, vol. 65, no. 1.**

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**Keywords:** OHIP-49; occupational health; oral health; oral health-related quality of life; overtime work.

**Evidence Level:** 4B

**Link:** [https://www.istage.jst.go.jp/article/josnusd/65/1/65\\_22-0267/\\_article](https://www.istage.jst.go.jp/article/josnusd/65/1/65_22-0267/_article)

### **How work-nonwork conflict affects remote workers' general health in China: A self-regulation theory perspective**

**Background:** Difficulty in balancing the demands of work and nonwork has been shown to be associated with lower physical and psychological health. **Methods:** Grounded on the self-regulation theory, we examined the effect of work-nonwork conflict on general health among employees who transitioned to remote work (remote workers), and we tested whether this association was mediated by impaired self-control capacity. The study further examined the perceived boundary control as a moderator of these associations. **Results:** We collected two waves of questionnaire data with a one-month interval from 461 remote workers, and the results of regression-based analyses revealed that work-nonwork conflict was negatively related to remote workers' general health through increased self-control capacity impairment. In addition, this indirect effect was weaker for remote workers with higher perceived boundary control than those with lower perceived boundary control. **Conclusion:** These findings expand our understanding of remote workers' work-nonwork conflict and have practical implications for promoting the general health of remote workers who are experiencing work-nonwork conflict.

**Shi et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** General health; perceived boundary control; remote worker; self-control capacity impairment; self-regulation theory; work-nonwork conflict.

**Evidence Level:** 4B

Link: <https://www.mdpi.com/1660-4601/20/2/1337>

## Work Health and Safety

*This month's Health and Safety section has a focus on firefighters, with studies examining the culture and awareness of occupational health risks, the incidence of cancer, and contamination of personal protective equipment and workplaces amongst firefighters. We also explore injuries suffered by mounted and non-mounted police officers, and risk factors for rotator cuff disease and cervical spondylosis surgery. In Covid-19 related research we examine the efficacy of personal protective equipment to prevent environmental infection among healthcare workers and two case studies on work-related stress deaths.*

### Culture and awareness of occupational health risks amongst UK firefighters

**Background:** Firefighters are exposed to toxic chemicals not only from the fire incidents they attend, but also from their contaminated station and/or personal protective equipment (PPE). **Methods:** Little is currently known about firefighters' awareness, attitudes, and behaviours towards contaminants which was assessed in the UK firefighter contamination survey. **Results:** Results revealed that lack of training on fire effluents and their health outcomes are strongly associated with increased fire smoke/contaminant exposure. Notably, untrained firefighters were at least twice as likely to: never clean personal protective equipment (PPE) (Crude Odds Ratio, OR 2.0, 1.5-2.7), infrequently send their PPE for professional cleaning (OR 2.0, 1.6-2.4), remain in the workwear (t-shirt etc.) worn while attending a fire incident (OR up to 3.6, 2.3-5.6), and indicate that cleaning at fire stations is not taken seriously (OR 2.4, 2.2-2.6). Firefighters personally viewing contamination as a "badge of honour" (BoH) were at least twice as likely to: remain in contaminated PPE after fire incidents (OR 2.3, 1.4-3.9), eat with sooty hands (OR 2.2, 1.9-2.5), notice soot in the nose/throat (OR 3.7, 2.7-5.2), and smell fire smoke on the body for more than a day after incidents (OR 2.0, 1.6-2.4). They were also more likely to indicate that cleaning at fire stations is not taken seriously (OR 2.5, 2.2-2.9) and that fire stations smell of smoke always/most of the time (OR 2.3, 2.0-2.6). Strong links were also found between belief in the BoH and never cleaning PPE (OR 1.9, 1.4-2.7), and eating while wearing contaminated PPE (OR 1.8, 1.5-2.2).

**Wolffe et al. 2023.**

**Scientific Reports, vol. 13, no. 97.**

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**Keywords:** Occupational health risk; personal protective equipment; culture; awareness; firefighters.

**Evidence Level:** 5B

**Link:** <https://www.nature.com/articles/s41598-022-24845-8>

### Cancer incidence amongst UK firefighters

**Background:** Firefighters suffer an increased risk of cancer from exposures to chemicals released from fires. Our earlier research has found that fire toxicants not only remain on firefighters' PPE, but are also tracked back to fire stations. **Methods:** The UK Firefighter Contamination Survey assesses firefighters' risk of developing cancer due to occupational exposure to fire toxins. **Results:** Over 4% of surveyed firefighters were found to have a cancer diagnosis, with the age-specific cancer rate up to 323% higher (35-39 year olds) than that of the general population. Firefighters who had served  $\geq 15$  years were 1.7 times more likely to develop cancer than those who had served less time. Firefighters were at least twice as likely to be diagnosed with cancer if they noticed soot in their nose/throat (odds ratio (OR) = 2.0, 1.1-3.5), or remained in their PPE for more than four hours after attending a fire incident (OR = 2.3, 1.1-5.2). Also associated with an increased likelihood of cancer was: eating while wearing PPE (OR = 1.8, 1.2-2.7); failing to store clean/dirty PPE separately (OR = 1.3, 1.0-1.7); working in a station that smells of fire (OR = 1.3, 1.0-1.8) or not having designated (separated) clean and dirty areas (OR = 1.4, 1.1-1.7); using an on-site washing machine to launder fire hoods (OR = 1.3, 1.0-1.7); feeling that cleaning is not taken seriously at work (OR = 1.5, 1.2-2.0).

**Wolffe et al. 2023.**

**Scientific Reports, vol. 12, no. 22072.**

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**Keywords:** Cancer; firefighters; risk; exposure; fires.

**Evidence Level:** 4B

**Link:** <https://www.nature.com/articles/s41598-022-24410-3>

### **Contamination of UK firefighters personal protective equipment and workplaces**

**Background:** Firefighters' personal protective equipment (PPE) is a potential source of chronic exposure to toxic contaminants commonly released from fires. These contaminants have also been found in fire stations. However, little research characterises the routes via which fire contaminants travel back to fire stations. **Methods:** The UK Firefighter Contamination Survey provides information on firefighters' PPE provision, decontamination, and storage practices. All serving UK firefighters were eligible to take part in the survey, which comprised 64 questions. **Results:** A total of 10,649 responses were included for analysis, accounting for roughly 24% of the UK's firefighting workforce. Results revealed that most firefighters (84%) de-robe contaminated PPE/workwear after re-entering the appliance cab. There was a significant decreasing tendency to send PPE for cleaning after every incident with increasing seniority of role, length of service, and fire attendance frequency. Around one third of firefighters cleaned PPE after every incident. A number of issues were linked to external professional cleaning services, e.g. shrinkage, fit, turn-around time, and stock of reserve/pooled PPE. PPE storage was found to be a potential source of cross contamination, with almost half of firefighters (45%) indicating clean and dirty PPE is not stored separately. More than half of firefighters (57%) stored fire gloves (an item sent for professional decontamination by only 19% of firefighters, and never cleaned by 20%) within other items of PPE such as helmets, boots and tunic/trouser pockets. **Conclusion:** The survey's results can be used to target gaps in decontamination measures within UK Fire and Rescue Services.

**Wolffe et al. 2023.**

**Scientific Reports, vol. 13, no. 65.**

**User License:** *Creative Commons Attribution (CC BY 4.0)* (<https://creativecommons.org/licenses/by/4.0/>)

**Keywords:** Personal protective equipment; contamination; firefighters; workplaces.

**Evidence Level:** 5B

**Link:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9832125/>

### **Characterization of injuries suffered by mounted and non-mounted police officers**

**Background:** Mounted police officers are subject to unique occupational tasks which may lead to unique injuries. This study's aim was to describe policing injuries suffered by mounted police officers contextualized through comparison to non-mounted officers. **Methods:** Injury data from 01 July 2014 to 30 June 2020 were provided from a state policing agency's incident reporting database. The data reported the numbers and rates of injuries and classified the injuries by gender, cause, mechanism, nature, and hours worked. **Results:** Of the 35,406 reported injuries, 35,255 (99.6%) injuries were reported by non-mounted police officers. An annual incidence rate of 338-364 and 626-952 injuries per 1000 personnel were reported in non-mounted and mounted police, respectively. For mounted police, the leading causes of injuries were slips, trips, and falls (23.8%), followed by repetitive tasks and movements (9.9%). Physical assault was the leading cause of injury for non-mounted police officers (21.3%), followed by slips, trips, and falls (16.0%). In mounted police, falls from heights (15.9%) and repetitive tasks and movements (10.6%) comprised the most frequently specified mechanisms of injury, as compared to physical assault (21.0%) and physical exercise (5.2%) in non-mounted police. The most common activities being performed at the time of injury for mounted police were animal handling (64.9%) as opposed to arresting an offender (31.2%) for non-mounted police. Sprains and strains and bruises and swelling were the leading natures of injuries among both mounted (44.4% and 29.1%, respectively) and non-mounted (36.6% and 21.2%, respectively) officers. The leading body sites of injury in mounted officers were the lower back (13.9%) and neck and shoulders (7.3% each), and for non-mounted police, the knee (13.9%), lower back (10.0%), and hand (8.2%) were the most common. **Conclusions:** Mounted police officers sustained injuries through different activities, causes, and mechanisms and to different body sites at 2-3 times higher incidence rates. Mounted police officers warrant specifically tailored injury mitigation and return-to-work strategies.

Orr et al. 2023.

**International Journal of Environmental Research and Public Health**, vol. 20, no. 2.

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**Keywords:** Back pain; equestrian; horses; law enforcement; occupation; policing.

**Evidence Level:** 4A

**Link:** <https://www.mdpi.com/1660-4601/20/2/1144>

### **Occupational demands associated with rotator cuff disease surgery in the UK Biobank**

**Background:** Physically-demanding occupations may increase rotator cuff disease (RCD) risk and need for surgery. We linked a job-exposure matrix (JEM) to the UK Biobank cohort study to measure physical occupational exposures and estimate associations with RCD surgery. **Methods:** Jobs and UK Standard Occupational Classification (SOC) codes were recorded during the UK Biobank verbal interview. Lifetime job histories were captured through a web-based survey. UK SOC codes were linked to a JEM based on the US O\*NET database. O\*NET-based scores [static strength, dynamic strength, general physical activities, handling/moving objects (range=1-7), time spent using hands, whole body vibration, and cramped/awkward positions (range=1-5)] were assigned to jobs. RCD surgeries were identified through linked national hospital inpatient records. Multivariable Cox regression was used to calculate hazard ratios (HR) as estimates of associations with RCD surgery. Among those with lifetime job histories, associations were estimated for duration of time with greatest exposure (top quartile of exposure). **Results:** Of 277 808 people reporting jobs, 1997 (0.7%) had an inpatient RCD surgery. After adjusting for age, sex, race, education, area deprivation, and body mass index, all O\*NET variables considered were associated with RCD surgery (HR per point increase range=1.10-1.45, all  $P < 0.005$ ). A total of 100 929 people reported lifetime job histories, in which greater exposures were significantly associated with RCD surgery after >10 years of work (eg, HR for 11-20 versus 0 years with static strength score  $\geq 4 = 2.06$ , 95% confidence interval 1.39-3.04). **Conclusions:** Workplace physical demands are an important risk factor for RCD surgery, particularly for workers with more than a decade of exposure.

**Yanik et al. 2023.**

**Scandinavian Journal of Work, Environment and Health**, vol. 49, no. 1.

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**Keywords:** Rotator cuff disease; surgery; occupational demands; risk.

**Evidence Level:** 4B

**Link:** <https://www.sjweh.fi/article/4062>

### **Risk factors for surgically treated cervical spondylosis in male construction workers: A 20-year prospective study**

**Background:** Degenerative changes due to cervical spondylosis (CS) can detrimentally affect work ability and quality of life yet understanding of how physical exposure affects disease progression is limited. Purpose: To assess the associations between occupational physical exposures and occurrence of surgically treated cervical spondylosis (ST-CS) and early exit from the labor market via disability pension. Study design/setting: Prospective register study with 20 years follow-up period. Patient sample: Swedish construction workers participating in a national health surveillance project conducted between 1971 and 1993. Outcome measures: Surgically treated cervical spondylosis (ST-CS) and early labor market exit at a minimum rate of 25% time on disability pension. **Methods:** Associations between occupational physical exposures (job exposure matrix) and subsequent ST-CS (National Hospital in-patient register) and early labor market exit via disability pension (Swedish Social Insurance Agency register) were assessed in a cohort of male construction workers ( $n=237,699$ ). **Results:** A total of 1381 ST-CS cases were present and a 20 years incidence rate of 35.1 cases per 100,000 person years (95% confidence interval (CI) 33.2-36.9). Increased relative risk (RR) for ST-CS was found for workers exposed to non-neutral (RR 1.40, 95% CI 1.15-1.69), and awkward neck postures (1.52, 1.19-1.95), working with the hands above shoulder height (1.30, 1.06-1.60), and high upper extremity loading (1.35, 1.15-1.59). Increased risk was also present for workers who reported frequent neck (3.06, 2.18-4.30) and upper back (3.84, 2.57-5.73) pain in the 12 months prior to survey. Among workers with elevated arm exposure, higher risk was seen in those who also had more frequent neck pain. ST-CS cases took early retirement more often (41.3%) and at a younger age (53 years)



than the total study cohort (14.8% and 56 years of age, respectively). **Conclusions:** Occupational exposure to non-neutral neck postures, work with hands above shoulders and high loads born through the upper extremities increased the risk for ST-CS and early retirement due to disability. Decreasing postural and load exposure is salient for primary, secondary, and tertiary prevention of CS. Neck pain was shown to be a prognostic factor for ST-CS, which stresses the importance of acting early and taking preventative action to reduce workplace exposure, and the need for systematic medical check-ups within primary or occupational care to mitigate disease progression and early labour market exit due to disability.

**Jackson et al. 2023.**

**The Spinal Journal, vol. 23, no. 1.**

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**Keywords:** Early-retirement; hand tools; job exposure matrix; neck pain; repetitive; static work; upper-back pain.

**Evidence Level:** 4B

**Link:** [https://www.thespinejournalonline.com/article/S1529-9430\(22\)00872-5/fulltext](https://www.thespinejournalonline.com/article/S1529-9430(22)00872-5/fulltext)

### **Efficacy of personal protective equipment to prevent environmental infection of COVID-19 among healthcare workers: A systematic review**

**Background:** Healthcare workers (HCWs) employed personal protective equipment (PPE) during the COVID-19 pandemic, crucial to protecting themselves from infection. To highlight the efficacy of PPE in preventing environmental infection among HCWs, a systematic review was conducted in line with PRISMA guidance.

**Methods:** A search of the PubMed and Web of Science databases was conducted from January 2019 to April 2021 using pre-defined search terms. Articles were screened by three researchers. The approved papers were read in full and included in this review if relevance was mutually agreed upon. Data were extracted by study design and types of PPEs. **Results:** 47 of 108 identified studies met the inclusion criteria, with seven reviews and meta-analyses, seven cohort, nine case-control, fifteen cross-sectional studies, four before and after, four case series, and one modeling studies. Wearing PPE offered COVID-19 protection in HCWs but required adequate training. Wearing surgical masks provided improved protection over cloth masks, while the benefit of powered air-purifying respirators is less clear, as are individual gowns, gloves, and/or face shields. **Conclusions:** Wearing PPE, especially facial masks, is necessary among HCWs, while training in proper use of PPE is also important to prevent COVID-19 infection.

**Soleman et al. 2023.**

**Environmental Health and Preventive Medicine, vol. 28.**

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**Keywords:** COVID-19; environmental infection; facial masks; healthcare workers; personal protective equipment.

**Evidence Level:** 1A

**Link:** [https://www.ijstage.jst.go.jp/article/ehpm/28/0/28\\_22-00131/article](https://www.ijstage.jst.go.jp/article/ehpm/28/0/28_22-00131/article)

### **The job that kills the worker: Analysis of two case reports on work-related stress deaths in the COVID-19 era**

**Background:** The COVID-19 pandemic caused an increasing number of corporate layoffs and downsizing, as well as causing many employees to be absent due to illness, with inevitable consequences on the health of active workers both from a physical point of view, due to the need to make up for staff and organizational shortages, and from a mental point of view, due to the inevitable consequences related to the uncertainty of the social context. This context has certainly caused an increase in work-related stress, which is the pathological outcome of a process that affects workers who are subjected to excessive (emotional-relational or high or low or inadequate activity) or improper work loads. **Methods:** The purpose of this paper is to evaluate the main aspects of this issue, through the analysis proposed by two case reports, both of which occurred during the COVID-19 pandemic, in which occupational stress emerged as an etiological agent in the determinism of death.

**Marrone et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 1.**

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**Keywords:** COVID-19; death; physical illness; stress; work loads.

**Evidence Level:** 5A

**Link:** <https://www.mdpi.com/1660-4601/20/1/884>

## Risk Assessment

*This month we explore the risk of osteoarthritis associated with exposure to ergonomic factors at work, the experience of noise in communication-intense workplaces and a newly developed tool to assess and classify work-related stress.*

### **Risk of symptomatic osteoarthritis associated with exposure to ergonomic factors at work in a nationwide Italian survey**

**Background:** The risk of developing osteoarthritis (OA) has been reported to increase with exposure to various ergonomic factors at work, although this finding is still debated in the literature. Aim of this study was to assess the association between prevalence of symptomatic OA and exposure to workplace ergonomic factors assigned through a job-exposures matrix (JEM). **Methods:** The study population was composed of 24,604 persons of 40-69 years who participated in the National Health Survey 2013 and were employed at that occasion. Exposure to ergonomic factors was assigned to the study population through a JEM constructed from the Italian O\*NET database, consisting of 17 physical factors, which were summed and averaged by job title (796 jobs) to obtain a combined exposure index. The outcome was self-reported OA characterized by moderate or severe limitations in daily activities. The relationship between OA prevalence and the combined exposure index in quartiles was examined using robust Poisson regression models adjusted for socio-demographics and potential confounders. **Results:** In the analysis adjusted for age and gender, the risk of OA was increased by approximately 20-30% in the second and third quartiles, and by 80% in the highest exposure quartile, compared to the least exposed, with a risk attenuation by approximately 15-20% controlling for other significant covariates. **Conclusion:** Our results support a causal role of exposure to physical factors at work in the development of OA. As OA is associated with a great burden of disability, any effort should be made to reduce workers' exposure to ergonomic factors. **d'Errico et al. 2023.**

**International Archives of Occupational and Environmental Health, vol. 96**

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**Keywords:** Ergonomic factors; job-exposure matrix; musculoskeletal disorders; occupational health; osteoarthritis; physical factors.

**Evidence Level:** 4B

**Link:** <https://link.springer.com/article/10.1007/s00420-022-01912-1>

### **The experience of noise in communication-intense workplaces: A qualitative study**

**Background:** The aim of the study was to explore and describe how workers in communication-intense workplaces in health care and preschools experience the sound environment. The dependence on vocal communication and social interaction poses a challenge using hearing protection in these working environments. **Method:** A qualitative method was used, more specifically inductive thematic analysis was used, as this approach was deemed suitable to explore the staff's experiences of the sound environment. Data were collected by interviews and to increase trustworthiness, several researchers were involved in the data collection and analysis. Workers from two preschools, one obstetrics ward and one intensive care unit took part in the study. **Results:** Four main themes emerged from the thematic analysis: A challenging and harmful sound environment; Health-related effects of a challenging and harmful sound environment; A good sound environment is not prioritised; and Resourceful and motivated staff. **Conclusions:** Workers in communication-intense workplaces in preschools, obstetrics care and intensive care reported that there was a relationship between the sound environment and negative health effects. In addition, the results suggests that the high motivation for change among staff should be utilised together with an increased prioritization from the management to reach innovative context specific improvements to the sound environment in communication intense working environments.

Gyllensten et al. 2023.

PLoS One, vol. 18, no. 1.

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Keywords: Noise; communication-intensive; health care; preschools; sound environment.

Evidence Level: 5B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280241>

### Face, content, criterion and construct validity assessment of a newly developed tool to assess and classify work-related stress (TAWS- 16)

**Background:** As work-stress, is associated with Non Communicable Diseases, and decreased work productivity, health and economic benefits are expected from periodic work-stress screening among employees using valid and reliable tools. Tool to Assess and classify Work Stress (TAWS- 16) was developed to overcome limitations in existing work-stress assessment tools in India. This study aims to test face, content, criterion and construct validity of TAWS- 16 in a sample of managerial-supervisory employees.

**Methods:** Nine domain experts rated face and content validity of TAWS- 16. Content validity was measured by Content Validity Indices (I-CVI, S-CVI) and Modified Kappa statistics. Empirical validity was tested by analysing data reported from 356 Information Technology (IT) professionals wherein Exploratory Factor Analysis was conducted for the assessment of Construct Validity. Self-reported data was collected in an unlinked and anonymous manner using a web-link, which was emailed to the study subjects, after initial introductory telephone or personal conversation. Criterion Validity was tested against stress sub-scale of DASS- 21. This study was approved by NIMHANS ethics committee. **Results:** Findings revealed that TAWS- 16 has good face validity. The content validity is acceptable (CVI = 0.829). Construct Validity is appropriate as 60.8% of the total variance was explained by the factors identified in our study. Criterion Validity was moderate (Kappa Value 0.208) due to inappropriate work-stress instrument for comparison with TAWS- 16.

**Conclusions:** Overall, TAWS- 16 demonstrated good face, content and construct validity. It measures work-stressors, coping abilities and psycho-somatic symptoms associated with work-stress. We recommend use of TAWS- 16 for periodic screening and classification of work-stress among employees.

Roy et al. 2023.

PLoS One, vol. 18, no. 1.

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Keywords: Work related stress; productivity; employees; assessment.

Evidence Level: 5B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280189>

## Chronic Health Issues

*This month we examine interventions to promote work participation in people with rheumatic and musculoskeletal diseases, the burden of occupational cancer, working status and risk of Alzheimer's disease and the relationship between myopia and near work*

### Non-pharmacological interventions to promote work participation in people with rheumatic and musculoskeletal diseases: A systematic review and meta-analysis from the EULAR taskforce on healthy and sustainable work participation

**Objective:** To summarise the evidence on effectiveness of non-pharmacological (ie, non-drug, non-surgical) interventions on work participation (sick leave, work status and presenteeism) in people with rheumatic and musculoskeletal diseases (RMDs). **Methods:** A systematic review of randomised controlled trials (RCTs) and longitudinal observational studies (LOS) was performed. Qualitative (RCTs/LOS) and quantitative (RCTs) evidence syntheses were conducted. Mixed-effects restricted maximum likelihood models were used to combine effect estimates, using standardised mean differences (SMDs) as the summary measure for each outcome domain separately, with a negative SMD favouring the intervention over comparator. Subgroup analyses were performed for type of RMD, risk status at baseline regarding adverse work outcomes and intervention characteristics. **Results:** Of 10 153 records, 64 studies (37 RCTs and 27 LOS; corresponding

to  $k=71$  treatment comparisons) were included. Interventions were mostly conducted in clinical settings (44 of 71, 62%). Qualitative synthesis suggested clear beneficial effects of 7 of 64 (11%) interventions for sick leave, 1 of 18 (6%) for work status and 1 of 17 (6%) for presenteeism. Quantitative synthesis (37 RCTs;  $k=43$  treatment comparisons) suggested statistically significant but only small clinical effects on each outcome ( $SMD_{\text{sick leave}}$  (95% CI)=-0.23 (-0.33 to -0.13;  $k=42$ );  $SMD_{\text{work status}}$ =-0.38 (-0.63 to -0.12;  $k=9$ );  $SMD_{\text{presenteeism}}$ =-0.25 (-0.39 to -0.12;  $k=13$ )). **Conclusion:** In people with RMDs, empirical evidence shows that non-pharmacological interventions have small effects on work participation. Effectiveness depends on contextual factors such as disease, population risk status, intervention characteristics and outcome of interest, highlighting the importance of tailoring interventions.

**Butink et al. 2023.**

**RMD Open, vol. 10**

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**Keywords:** Occupational therapy; psychology; rehabilitation.

**Evidence Level:** 1A

**Link:** <https://rmdopen.bmj.com/content/9/1/e002903.long>

### **Myopia and near work: A systematic review and meta-analysis**

**Background:** Myopia is a global public health problem affecting quality of life and work productivity. Data is scarce regarding the effects of near work on myopia. Providing a larger meta-analysis with life-long perspective, including adults and occupational exposure seemed needed. **Methods:** We searched PubMed, Cochrane Library, Embase and Science Direct for studies reporting myopia prevalence in near work. Myopia was defined as a mean spherical equivalent  $\leq -0.50$  diopter. We performed a meta-analysis using random-effects model on myopia prevalence, myopia progression per year, and odds ratio (OR) of myopia in near work, completed by subgroup analyses and meta-regressions on patients' characteristics, type of work in adults, geographic zones, time and characteristics of near work. **Results:** We included 78 studies, representing a total of 254,037 participants, aged from 6 to 39 years. The global prevalence of myopia in near work was 35% (95% CI: 30 to 41%), with a prevalence of 31% (95% CI: 26 to 37%) in children and 46% (95% CI: 30 to 62%) in adults. Myopia progression was -0.39 diopters per year (-0.53 to -0.24 D/year), ranging from -0.44 (-0.57 to -0.31) in children to -0.25 D/year (-0.56 to 0.06) in adults. The odds of myopia in workers exposed vs. non-exposed to near work were increased by 26% (18 to 34%), by 31% (21 to 42%) in children and 21% (6 to 35%) in adults. Prevalence of myopia was higher in adults compared to children (Coefficient 0.15, 95% CI: 0.03 to 0.27). **Conclusions:** Near work conditions, including occupational exposure in adults, could be associated with myopia. Targeted prevention should be implemented in the workplace.

**Dutheil et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 1.**

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**Keywords:** Epidemiology; myopia; near work; occupation; public health.

**Evidence Level:** 1A

**Link:** <https://www.mdpi.com/1660-4601/20/1/875>

### **Burden of occupational cancer in Brazil and federative units, 1990-2019**

**Background:** To analyze the spatiotemporal distribution of the burden of occupational cancer in Brazil and federative units between 1990 and 2019. **Methods:** Data were extracted from the Global Burden of Disease (GBD) study. Deaths from cancer whose attributable risk factor was occupational carcinogens were considered. Spatial analysis was performed with the first and last years of the series (1990 and 2019). Age-adjusted mortality rates were used to estimate the global Moran's Index (Moran's I), and the local indicator of spatial association (LISA) to identify clusters in the country with the respective statistical significance. The occupational cancer mortality rate, adjusted for age, was analyzed based on its trend for Brazil and federative units, in the period between 1990 and 2019. **Results:** Between 1990 and 2019, occupational cancer mortality rate showed a decreasing trend ( $R^2=0.62$ ;  $p<0.001$ ) as well as the burden of disease indicator - DALY ( $R^2=0.84$ ;  $p<0.001$ ). However, mortality is increasing in most states, suggesting that a minority of federative units induce the country's global trend. There is also the development of a spatial

pattern of autocorrelation, indicating clusters of states with low mortality and DALY rates in the Northeast and high values in the South of the country. **Conclusion:** The overall decreasing trend in the trend of occupational cancer masks the heterogeneity across states. This scenario may be associated with the diversity of economic activities, and suggests a decentralized and equitable plan for occupational cancer surveillance.

**Dutra et al. 2023.**

**Brazilian Journal of Epidemiology, vol. 26.**

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**Keywords:** Cancer; occupational cancer; disease burden; risk factors.

**Evidence Level:** 4B

**Link:** <https://www.scielo.br/j/rbepid/a/TQgmyRr4hRFnrCrbfxN5mQP/?lang=en>

### **Working status and risk of Alzheimer's disease: A Mendelian randomization study**

**Background:** Alzheimer's disease (AD) has become a common illness affecting the elderly, adding to society's social and financial burden. We used two-sample Mendelian randomization (MR) in this study to determine the association between working status and AD. **Methods:** We performed a two-sample MR analysis. The genetic associations were derived from the UK Biobank (n = 263,615) and the International Genomics of Alzheimer's Project (n = 63,926). Inverse variance weighted (IVW), MR-Egger, and weighted median were used in the MR analysis. The funnel plot, Cochran's Q test, MR-Egger intercept test, and leave-one-out analysis were used in sensitivity analyses. Further risk factor analyses were carried out to look into the potential mediators. **Results:** Jobs involve heavy manual or physical work (OR = 2.13, 95%CI 1.36-3.36; p = .0011), job involves mainly walking or standing (OR = 1.74, 95%CI 1.19-2.54; p = .004), and job involves shift work (OR = 2.78, 95%CI 1.14-6.80; p = .02) increased the risk of AD in the IVW analysis. There was no heterogeneity and no horizontal pleiotropy in the sensitivity analysis. Risk factor analysis suggested that each of the above association may be mediated by different risk factors. **Conclusion:** Our study adds to the evidence that the development of AD is associated with the working status (job involves heavy manual or physical work, job involves mainly walking or standing, and job involves shift work) by using extensive human genetic data.

**Zhao et al. 2023.**

**Brain and Behavior, vol. 13, no. 1.**

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**Keywords:** Alzheimer's disease; Mendelian randomization; job involves heavy manual or physical work; job involves mainly walking or standing; job involves shift work.

**Evidence Level:** 2B

**Link:** <https://onlinelibrary.wiley.com/doi/10.1002/brb3.2834>

## **Occupational Exposure**

*In this month's Occupational Exposure section, we review the relationship between occupational heat exposure and occupational injuries and prostate cancer risk and the impact of video evidence of violent crime on criminal justice professionals*

### **Workplace trauma in a digital age: The impact of video evidence of violent crime on criminal justice professionals**

**Background:** High-quality video and audio recordings of violent crimes, captured using now ubiquitous digital technologies, play an increasingly important role in the administration of justice. However, the effects of exposure to gruesome material presented in this form on criminal justice professionals who analyze, evaluate, and use this potentially traumatic content in the context of their work, are largely unknown. **Methods:** Using long interviews and constructivist grounded theory, this qualitative study sought to explore experiences of exposure to video evidence of violent crime among Canadian criminal justice professionals. Sixteen individuals including police, lawyers, judges, psychiatrists, law clerks, and court reporters volunteered to participate in qualitative long interviews asking about workplace exposures to



violent videos. **Results:** Themes identified address the ubiquity of video evidence of violent crime; proximity to violence through video; being blindsided through lack of preparedness for violent content; repeated exposures through multiple and protracted viewings; insufficient customary methods for self-protection; and the enduring impact of exposure to videoed violence. **Conclusions:** We determine that criminal justice professionals are increasingly and repeatedly presented with deeply disturbing imagery that was once imperceptible or unknowable and thus previously held at a greater distance. Elements of what is newly visible and audible in video evidence of violent crime create a new emotional proximity to violence that potentially increases the risks of secondary trauma and underscores the need for improved safety measures.

**Birze et al. 2023.**

**Journal of Interpersonal Violence, vol. 38, no. 1-2.**

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**Keywords:** Criminal justice; posttraumatic stress disorder; secondary trauma; video-evidence; violent crime.

**Evidence Level:** 5B

**Link:** <https://journals.sagepub.com/doi/full/10.1177/08862605221090571>

### **Association between extreme temperature exposure and occupational injuries among construction workers in Italy: An analysis of risk factors**

**Background:** Extreme temperatures have impact on the health and occupational injuries. The construction sector is particularly exposed. This study aims to investigate the association between extreme temperatures and occupational injuries in this sector, getting an insight in the main accidents-related parameters. **Methods:** Occupational injuries in the construction sector, with characteristic of accidents, were retrieved from Italian compensation data during years 2014-2019. Air temperatures were derived from ERA5-land Copernicus dataset. A region based time-series analysis, in which an over-dispersed Poisson generalized linear regression model, accounting for potential non-linearity of the exposure-response curve and delayed effect, was applied, and followed by a meta-analysis of region-specific estimates to obtain a national estimate. The relative risk (RR) and attributable cases of work-related injuries for an increase in mean temperature above the 75th percentile (hot) and for a decrease below the 25th percentile (cold) were estimated, with effect modifications by different accidents-related parameters.

**Results:** The study identified 184,936 construction occupational injuries. There was an overall significant effect for high temperatures (relative risk (RR) 1.216 (95% CI: (1.095-1.350))) and a protective one for low temperatures (RR 0.901 (95% CI: 0.843-0.963)). For high temperatures we estimated 3,142 (95% CI: 1,772-4,482) attributable cases during the studied period. RRs from 1.11 to 1.30 were found during heat waves days. Unqualified workers, as well as masons and plumbers, were found to be at risk at high temperatures. Construction, quarry and industrial sites were the risky working environments, as well as specific physical activities like working with hand-held tools, operating with machine and handling of objects. Contact with sharp, pointed, rough, coarse 'Material Agent' were the more risky mode of injury in hot conditions.

**Conclusions:** Prevention policies are needed to reduce the exposure to high temperatures of construction workers. Such policies will become a critical issue considering climate change.

**Gariazzo et al. 2023.**

**Environmental International, vol. 171.**

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**Keywords:** Accident characteristics; compensation claim; heat-wave; meta-analysis; risk; time-series.

**Evidence Level:** 4B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0160412022006043?via%3Dihub>

### **Occupational heat exposure and prostate cancer risk: A pooled analysis of case-control studies**

**Background:** Heat exposures occur in many occupations. Heat has been linked to key carcinogenic processes, however, evidence for associations with cancer risk is sparse. We examined potential associations between occupational heat exposure and prostate cancer risk in a multi-country study.

**Methods:** We analysed a large, pooled dataset of 3142 histologically confirmed prostate cancer cases and

3512 frequency-matched controls from three countries: Canada, France, and Spain. Three exposure indices: ever exposure, lifetime cumulative exposure and duration of exposure, were developed using the Finnish Job-Exposure Matrix, FINJEM, applied to the lifetime occupational history of participants. We estimated odds ratios (ORs) and 95% confidence intervals (CIs), using conditional logistic regression models stratified by 5-year age groups and study, adjusting for potential confounders. Potential interactions with exposure to other occupational agents were also explored. **Results:** Overall, we found no association for ever occupational heat exposure (OR 0.97; 95% CI 0.87, 1.09), nor in the highest categories of lifetime cumulative exposure (OR 1.04; 95% CI 0.89, 1.23) or duration (OR 1.03; 95% CI 0.88, 1.22). When using only the Spanish case-control study and a Spanish Job Exposure Matrix (JEM), some weakly elevated ORs were observed. **Conclusions:** Findings from this study provide no clear evidence for an association between occupational heat exposure and prostate cancer risk.

**Hinchliffe et al. 2023.**

**Environmental Research, vol. 216.**

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**Keywords:** Case-control study; heat stress; occupational heat exposure; pooled analysis; prostate cancer.

**Evidence Level:** 5B

**Link:** <https://www.sciencedirect.com/science/article/pii/S0013935122019193?via%3Dihub>

## Sedentary Practices

### **Association between skeletal muscle mass and cardiovascular risk factors in occupational sedentary population: A cross-sectional study**

**Background:** The aims of this study were to determine the association of skeletal muscle mass with three cardiovascular risk factors and explore a simple and clinically feasible indicator for identifying high-risk groups of cardiovascular diseases in occupational sedentary population. **Methods:** We recruited 7316 occupational sedentary participants older than 18 years from the Health Management Center of Tianjin Union Medical Center. Age-adjusted logistic regression was used to analyze the association between skeletal muscle mass index (SMI) and cardiovascular risk factors. **Results:** There were significant positive associations between SMI, especially arm SMI, and cardiovascular risk factors in both male and female subjects (odds ratio, 1.28 to 5.02;  $P < 0.001$ ). **Conclusions:** Our findings suggest that measurements of skeletal muscle mass, particularly in the arms, may help identify individuals at high risk for cardiovascular disease in an occupationally sedentary population.

**Lu et al. 2023.**

**Journal of Occupational and Environmental Medicine, vol. 65, no. 1.**

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**Keywords:** Muscle mass; cardiovascular risk; cardiovascular disease.

**Evidence Level:** 4B

**Link:**

[https://journals.lww.com/joem/Fulltext/2023/01000/Association\\_Between\\_Skeletal\\_Muscle\\_Mass\\_and.16.aspx](https://journals.lww.com/joem/Fulltext/2023/01000/Association_Between_Skeletal_Muscle_Mass_and.16.aspx)

## Musculoskeletal Health

*This month we explore a passive shoulder exoskeleton support for overhead work, interventions to prevent back pain among office workers, the quality of occupational healthcare for carpal tunnel syndrome, and the correlation of frequency of work-related disorders with type of work.*

### **Passive shoulder exoskeleton support partially mitigates fatigue-induced effects in overhead work**

**Background:** Despite the potential of occupational passive shoulder exoskeletons (PSEs) to relieve overhead work, limited insights in overhead work precision performance impedes large-scale adoption in

industry. Objective: To investigate the effect of PSE support on the reduction in task performance caused by physical fatigue. **Methods:** This experiment consisted of a randomized, counterbalanced cross-over design comparing Exo4Work PSE support and no support, in a physically fatigued state and a control condition. Precision performance was determined using execution speed and drilling errors. Muscle activity and shoulder joint kinematics were recorded. **Results:** Fatigue altered task performance, shoulder joint kinematics, muscle activity and subjective experience during overhead work. The PSE support mitigated the fatigue-induced changes in shoulder kinematics. Additionally, a part of the fatigue-induced co-activation of shoulder stabilizing muscles was avoided when working with the PSE. The PSE support also reduced the activity of the anterior and medial deltoid. **Conclusion:** Physical fatigue provokes compensatory movements and increased co-contraction of muscles when executing overhead work. These fatigue-induced alterations are generally believed to increase the overall musculoskeletal load. The support provided by the PSE reduced muscle activity of muscles working to elevate the arm, but also partially mitigated those fatigue-induced effects. Significance: This study shows that the effect of PSE support on precision performance is limited, and suggested that, apart from the known effects of PSE support during overhead work, wearing the exoskeleton in a physically fatigued state may provide additional advantages.

**De Bock et al. 2023.**

**Applied Ergonomics, vol. 106.**

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**Keywords:** Device evaluation; physical fatigue; task analysis; wearable assistive device.

**Evidence Level:** 3A

**Link:** <https://www.sciencedirect.com/science/article/pii/S0003687022002265?via%3Dihub>

### **Interventions for preventing back pain among office workers - A systematic review and network meta-analysis**

**Background:** Back pain is common in the working population. This systematic review with network meta-analysis (NMA) aimed to compare the effects of interventions for preventing back pain among office workers. **Methods:** We searched eight databases and additional sources up to March 2021. We included randomized controlled trials (RCT) and cluster RCT focusing on office workers, comparing work-related interventions aimed at preventing back pain (defined as pain in any part of the spine) to a control condition and assessing back pain and/or work absence. Further outcomes considered were adverse events and participants' satisfaction. We performed both frequentist and component NMA. Risk of bias (RoB) was evaluated using RoB 2 and certainty of the evidence (CoE) was assessed using GRADE. **Results:** We screened 9809 records and included 24 studies with a total of 7080 participants. RoB was assessed as "some concerns" or "high" for all studies and outcomes. Included studies investigated multicomponent interventions, ergonomics, physical activity, education, behavioral interventions and no/minimal interventions. Effects were mostly not statistically significant and based on low/very low CoE. Physical activity probably reduces days of work absence slightly [mean difference (MD) -1.10, 95% confidence interval (CI) -2.07- -0.13], and combining physical activity and ergonomics may reduce back pain intensity (standardized MD -0.41, 95% CI -0.80- -0.02) when compared to no/minimal intervention. A large proportion of participants were satisfied with the interventions, adverse events were rarely assessed. **Conclusions:** We observed mostly minor effects of interventions on back pain and work absence among office workers. The practical relevance of these effects is questionable.

**Eisele-Metzger et al. 2023.**

**Scandinavian Journal of Work, Environment and Health, vol. 49, no. 1.**

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**Keywords:** Back pain; office workers; prevention.

**Evidence Level:** 1A

**Link:** <https://www.sjweh.fi/article/4070>

### **Characteristics of work-related musculoskeletal disorders in Korea**

**Background:** This study aimed to analyze trends for work-related musculoskeletal disorders (WMSDs) from 1996 to 2020 in Korea and to investigate characteristics of WMSDs, including WMSD approval rates, distribution by WMSD names, and the effects of industry type and size, and workers' age and gender on WMSD occurrence. **Methods:** The data included those obtained from the official yearbooks for industrial accidents published by the Ministry of Employment and Labor and those obtained personally from the Korea Workers' Compensation & Welfare Service. **Results:** The results showed that although the incidence of WMSDs differed by year, approximately 9500 cases of WMSDs occurred in 2019 and 2020, the incidence rate of WMSDs was approximately 5.0 per 10,000 workers, and the proportions of WMSDs among industrial accidents were almost 9%. Low back pain was the leading cause of WMSDs; WMSDs occupied 9.5-71.5% of total occupational diseases by year and occurred most frequently in the manufacturing industry, followed by construction, transportation/warehouse and communication, and mining industries, and nearly 60% of WMSDs occurred in small business with <math>\leq 50</math> workers. Among chronic WMSDs, rotator cuff syndrome in the shoulder ranked first, intervertebral disc disorders second, and rotator cuff and tendon injuries third. By body parts, the shoulder was most susceptible to chronic WMSDs, followed by the low back, leg, and elbow/lower arm. The chi-square test and logistic regression analysis showed that industry type and size and workers' gender and age were significantly associated with WMSD approval. **Conclusions:** It can be concluded that the WMSD preventive efforts should focus on low back pain and rotator cuff syndrome by WMSD name, manufacturing by industry, small business by industry size, men by gender, and aged workers by age.

**Kee 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Industrial accident; low back pain; occupational disease; rotator cuff injury; work-related musculoskeletal disorder.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1024>

### **The quality of occupational healthcare for carpal tunnel syndrome, healthcare expenditures, and disability outcomes: A prospective observational study**

**Background:** In prior work, higher quality care for work-associated carpal tunnel syndrome (CTS) was associated with improved symptoms, functional status, and overall health. We sought to examine whether quality of care is associated with healthcare expenditures or disability. **Methods:** Among 343 adults with workers' compensation claims for CTS, we created patient-level aggregate quality scores for underuse (not receiving highly beneficial care) and overuse (receiving care for which risks exceed benefits). We assessed whether each aggregate quality score (0%-100%, 100% = better care) was associated with healthcare expenditures (18-mo expenditures, any anticipated need for future expenditures) or disability (days on temporary disability, permanent impairment rating at 18 mo). **Results:** Mean aggregate quality scores were 77.8% (standard deviation [SD] 16.5%) for underuse and 89.2% (SD 11.0%) for overuse. An underuse score of 100% was associated with higher risk-adjusted 18-mo expenditures (\$3672; 95% confidence interval [CI] \$324 to \$7021) but not with future expenditures (-0.07 percentage points; 95% CI -0.48 to 0.34), relative to a score of 0%. An overuse score of 100% was associated with lower 18-mo expenditures (-\$4549, 95% CI -\$8792 to -\$306) and a modestly lower likelihood of future expenditures (-0.62 percentage points, 95% CI -1.23 to -0.02). Quality of care was not associated with disability. **Conclusions:** Improving quality of care could increase or lower short-term healthcare expenditures, depending on how often care is currently underused or overused. Future research is needed on quality of care in varied workers' compensation contexts, as well as effective and economical strategies for improving quality.

**Nuckols et al. 2023.**

**Muscle and Nerve, vol. 67, no. 1.**

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**Keywords:** Carpal tunnel syndrome; disability; healthcare expenditures; quality of care; workers' compensation.

**Evidence Level:** 4B

**Link:** <https://onlinelibrary.wiley.com/doi/10.1002/mus.27718>

**The correlation of frequency of work-related disorders with type of work among Polish employees**

**Background:** Musculoskeletal disorders have a significant negative impact on the quality of life of the population. These conditions, as well as other work-related disorders, generate costs associated with treatment and work absence, which makes it a growing problem in industrialized countries. Available data from studies on individual populations of workers indicate a higher incidence of certain symptoms in these groups. **Methods:** Due to the lack of studies on the general population, we aimed to perform the preliminary study evaluating the occurrence of pain and work-related conditions depending on the type of occupational work among Polish employees to identify further possible areas for research. Data was collected using an electronic self-administered questionnaire, which was distributed in groups bringing together various professionals. **Results:** The data obtained from 379 participants have been analyzed and divided according to performed work into sedentary, forced posture, standing, physical and requiring physical activity. Our study reveals a correlation between the frequency of work-related disorders and type of work performed in the Polish population. A significant correlation between the type of occupational work and prevalence of ankle, knee and shoulder pain, as well as heavy legs or upper limb paresthesia was found. **Conclusions:** According to our findings, female employees may be more vulnerable to lower limb symptoms. A place of residence also seems to affect the prevalence of upper back pain and heavy legs. The analysis also showed a correlation between the occurrence of hip, knee and ankle pain and the level of education of the participants. Surprisingly, lower extremity paresthesia was significantly more common among participants undertaking additional physical activity, compared to non-physically active respondents.

**Kliniec et al. 2023.**

**International Journal of Environmental Research and Public Health, vol. 20, no. 2.**

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**Keywords:** Ergonomics; occupation; pain; work in standing position; work-related disorders.

**Evidence Level:** 4B

**Link:** <https://www.mdpi.com/1660-4601/20/2/1624>