



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 May 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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Enabling Healthy and Safe Workplaces

Health and Wellbeing

This month we explore risk factors and prevalence of migraine symptoms in the banking sector, the relationship between occupational stress and hypertension, perceptions of wellbeing in a work integration social enterprise, the association of work with cancer survivors' health-related quality of life and the relationship between years of service and leukocyte epigenetic aging in firefighters. In Covid-19 related research we explore the impact on wellbeing of quarantine on frontline workers, and the effect of pandemic related factors on wellbeing.

A cohort study on the association between changing occupational stress, hair cortisol concentration, and hypertension

Background: To explore the relationship between changing occupational stress levels, hair cortisol concentration (HCC), and hypertension. **Method:** Baseline blood pressure of 2520 workers was measured in 2015. The Occupational Stress Inventory-Revised Edition (OSI-R) was used to assess changes in occupational stress. Occupational stress and blood pressure were followed up annually from January 2016 to December 2017. The final cohort numbered 1784 workers. The mean age of the cohort was 37.77 ± 7.53 years and the percentage male was 46.52%. At baseline, 423 eligible subjects were randomly selected for hair sample collection to determine cortisol levels. **Results:** Increased occupational stress was a risk factor for hypertension [risk ratio (RR) = 4.200, 95% confidence interval (CI): 1.734-10.172]. The HCC of workers with elevated occupational stress was higher than that of workers with constant occupational stress [(ORQ score ≥ 70 : geometric mean \pm geometric standard deviation = 5.25 ± 3.59 ng/g hair; 60-90: 5.02 ± 4.00 ; 40-59: 3.45 ± 3.41 ; < 40 : 2.73 ± 3.40) $\times 2 = 5.261$]. High HCC increased the risk of hypertension (RR = 5.270, 95% CI: 2.375-11.692) and high HCC was associated with higher rates of elevated diastolic and systolic blood pressure. The mediating effect of HCC was 0.51 [95% CI: 0.23-0.79, odds ratio (OR) = 1.67] and accounted for 36.83% of the total effect. **Conclusion:** Increased occupational stress could lead to an increase in hypertension incidence. High HCC could increase the risk of hypertension. HCC acts as a mediator between occupational stress and hypertension.

Wang et al. 2023.

PLoS One, vol. 18, no. 5.

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Keywords: Occupational stress; hair cortisol concentration; hypertension.

Evidence Level: 4A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285623>

Employees of the banking sector in Guizhou Province in China: prevalence of migraine, symptoms, disability and occupational risk factors

Background: Although studies have identified a high prevalence of migraine among employees in the banking sector, the symptoms of migraine, related disability and occupational risk factors are not well understood. **Aims:** To determine migraine prevalence, symptoms and disability among bank employees in Guizhou province in China and to examine occupational risk factors associated with migraine positivity and symptoms. **Method:** In a cross-sectional survey, two-stage probability sampling was used to select bank employees in Guizhou province, China. From May to October 2022, uniformly trained interviewers conducted face-to-face interviews using the HARDSHIP questionnaire. Logistic regression was used to examine factors associated with migraine positivity and symptoms. **Results:** Of 1,985 contactable eligible subjects, 1,929 (male 45.4%, female 54.6%) completed the survey. The one-year prevalence of migraine was 27.2% (95% CI 25.2-29.2%). Of migraine-positive individuals, 11.2% had a monthly frequency ≥ 15 days, 11.8% had an attack duration > 72 h, and 14.9% had severe pain intensity. The median of days lost from work, housework and social activities due to migraine during a three-month period was 4, 3 and 2 days, respectively, with more than half (52.8%) patients reporting Grade III or IV disability. In multivariable analyses, positions in data analysis (OR = 1.8 [95% CI 1.2-2.8], $p < 0.01$) and information technology (OR = 3.8 [95% CI 1.7-8.3], $p < 0.01$) were occupational risk factors for migraine positivity. It was also found that

professional positions were predictive of migraine attacks ≥ 15 days per month, administrative positions were predictive of duration > 72 h and severe pain intensity of migraine attacks, and working in remote branches was predictive of duration > 72 h. **Conclusion:** Migraine is prevalent among employees in the banking sector in Guizhou province in China, with a large proportion of sufferers carrying a high burden of symptoms and disability. The practical implication of this study is that the risk factors identified here could be translated to the focus of workplace monitoring and interventions to manage and prevent migraine.

Wei et al. 2023.

The Journal of Headache and Pain, vol. 24, no. 1.

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Keywords: Disability evaluation; migraine disorder; prevalence; risk factors; symptom assessment.

Evidence Level: 4B

Link: <https://thejournalofheadacheandpain.biomedcentral.com/articles/10.1186/s10194-023-01591-4>

Exploring the independent association of employment status to cancer survivors' health-related quality of life

Background: Having a job has been associated with better Health-Related Quality of Life (HRQOL) in cancer survivors. However, the sociodemographic and disease-related profiles characterizing the survivors being employed and those having better HRQOL largely overlap. The present study aims to discern the degree to which employment status is independently associated with cancer survivors' HRQOL or if it mainly reflects the impact of other sociodemographic and cancer-related variables. **Method:** Cross-sectional study on a heterogeneous sample of 772 working-age survivors of adult-onset cancer. An instrument specifically designed to assess HRQOL in cancer survivors and Multivariate Variance Analysis (MANOVA) were used.

Results: Survival phase, cancer type, and employment status showed the main effects on cancer survivors' HRQOL. In particular, being employed (vs unemployed) had the greatest positive association with HRQOL, affecting ten of the twelve HRQOL domains considered. Also, interaction effects highlighted the role of age (younger) and marital status (single) as risk factors for a greater negative impact of variables affecting the survivor's HRQOL. **Conclusion:** The application of a multivariate methodology sheds new light on two relevant issues for the cancer survivor's HRQOL: (i) the existence of differences between diagnostic groups that are not attributed to other variables such as sex, and (ii) the important and independent role that employment status plays. Comprehensive cancer survivorship care should focus more on high-risk groups and include having a job as an essential aspect to consider and prompt. The fact that the employment status is susceptible to change represents a valuable opportunity to care for the wellbeing of this population.

Andreu et al. 2023.

Health and Quality of Life Outcomes, vol. 21, no. 1.

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

Keywords: Age; cancer survivors; cancer type; employment status; marital status; quality of life; survival phase.

Evidence Level: 4A

Link: <https://hqlo.biomedcentral.com/articles/10.1186/s12955-023-02124-y>

Conflict in the EMS workforce: An analysis of an open-ended survey question reveals a complex assemblage of stress, burnout, and pandemic-related factors influencing well-being

Background: Emergency Medical Services (EMS) clinicians provide patient care within a high-stakes, unpredictable, and complex work environment in which conflict is inevitable. Our objective was to explore the extent to which added stressors of the pandemic exacerbated EMS workplace conflict. **Method:** We administered our survey to a sample of U.S. nationally certified EMS clinicians during the COVID-19 pandemic in April 2022. Out of 1881 respondents, 46% (n = 857) experienced conflict and 79% (n = 674) provided free-text descriptions of their experience. The responses were analyzed for themes using qualitative content analysis, and they were then sorted into codes using word unit sets. Code counts, frequencies, and rankings were tabulated, enabling quantitative comparisons of the codes. **Results:** Of the fifteen codes to emerge, stress (a precursor of burnout) and burnout-related fatigue were the key factors contributing to EMS workplace conflict. We mapped our codes to a conceptual model guided by the

National Academies of Sciences, Engineering, and Medicine (NASEM) report on using a systems approach to address clinician burnout and professional well-being to explore implications for addressing conflict within that framework. Factors attributed to conflict mapped to all levels of the NASEM model, lending empirical legitimacy to a broad systems approach to fostering worker well-being. Our findings lead us to propose that active surveillance (enhanced management information and feedback systems) of frontline clinicians' experiences during public health emergencies could increase the effectiveness of regulations and policies across the healthcare system. Ideally, the contributions of the occupational health discipline would become a mainstay of a sustained response to promote ongoing worker well-being. **Conclusion:** The maintenance of a robust EMS workforce, and by extension the health professionals in its operational sphere, is unquestionably essential to our preparedness for the likelihood that pandemic threats may become more commonplace.

Melnyk et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: COVID-19 pandemic; EMS clinician well-being; burnout; complexity; future of work; occupational health; systems thinking; workplace conflict; workplace stress.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/20/10/5861>

Perceptions of health and wellbeing among employees in a work integration social enterprise in Sweden

Background: Work Integration Social Enterprises (WISEs) constitute an important vehicle for providing employment opportunities for disadvantaged groups. **Objective:** The goal of this qualitative case study is to explore perceptions of health and wellbeing among employees working in a WISE located in the Gävleborg region, in east central Sweden. **Method:** Data were gathered using 16 in-depth, semi-structured interviews with the social enterprise employees. **Results:** Findings were categorized into three main categories: the importance of financial independence and societal benefits; team spirit and a sense of belonging; and improved quality of life and wellbeing. **Conclusion:** The participants perceived that working in the WISE gave them a feeling of freedom and increased their self-esteem because of the possibility to earn an income. Also, they were satisfied with their job (e.g., with regard to work quality and flexibility) and believed that their work contributed to society. Moreover, through working in a WISE, the participants felt a sense of belonging and togetherness through interaction with co-workers and managers, and an improved quality of life for themselves and their families.

Macassa et al. 2023.

Annals of Global Health, vol. 89, no. 1.

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Keywords: Sweden; employee health and wellbeing; work integration social enterprise.

Evidence Level: 5B

Link: <https://annalsofglobalhealth.org/articles/10.5334/aogh.4065>

The psychological and wellbeing impacts of quarantine on frontline workers during COVID-19 and beyond

Background: The current study investigated the experiences, wellbeing impacts, and coping strategies of frontline workers who participated in "Hotels for Heroes", an Australian voluntary hotel quarantine program during the COVID-19 pandemic. The program was open to those who were COVID-19 positive or exposed to COVID-19 as part of their profession. **Method:** Frontline workers who had stayed in voluntary quarantine between April 2020 and March 2021 were invited to participate in a voluntary, anonymous, cross-sectional online survey including both quantitative and qualitative responses. Complete responses were collected from 106 participants, which included data on sociodemographic and occupational characteristics, experiences of the Hotels for Heroes program, and validated mental health measures.

Results: Mental health problems were prevalent amongst frontline workers (e.g., moderate anxiety symptoms, severe depression symptoms, and greater than usual impact of fatigue). For some, quarantine appeared to be helpful for anxiety and burnout, but quarantine also appeared to impact anxiety, depression, and PTSD negatively, and longer stays in quarantine were associated with significantly higher

coronavirus anxiety and fatigue impacts. The most widely received support in quarantine was from designated program staff; however, this was reportedly accessed by less than half of the participants. **Conclusion:** The current study points to specific aspects of mental health care that can be applied to participants of similar voluntary quarantine programs in the future. It seems necessary to screen for psychological needs at various stages of quarantine, and to allocate appropriate care and improve its accessibility, as many participants did not utilise the routine support offered. Support should especially target disease-related anxiety, symptoms of depression and trauma, and the impacts of fatigue. Future research is needed to clarify specific phases of need throughout quarantine programs, and the barriers for participants receiving mental health supports in these contexts.

Holmes et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: COVID-19; coronavirus; mental health; quarantine; wellbeing.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/20/10/5853>

Occupational years of service and leukocyte epigenetic aging: Relationships in United States firefighters

Background: The aim of the study is to examine associations between years of firefighting service and eight chronological age-adjusted measures of blood leukocyte epigenetic age acceleration: Horvath, Hannum, SkinBloodClock, Intrinsic, Extrinsic, PhenoAge, GrimAge, and DNAm telomere length. **Method:** The study used a repeated measures analysis of data from 379 incumbent firefighters from eight career departments and 100 recruit firefighters from two of the departments, across the United States. **Results:** Incumbent firefighters had on average greater epigenetic age acceleration compared with recruit firefighters, potentially due to the cumulative effect of occupational exposures. However, among incumbent firefighters, additional years of service were associated with epigenetic age deceleration, particularly for GrimAge, a strong predictor of mortality. **Conclusion:** Long-term studies with more specific occupational exposure classification are needed to better understand the relationship between years of service and aging biomarkers.

Nwanaji-Enwerem et al. 2023.

Journal of Occupational and Environmental Medicine, vol. 65, no. 5.

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Keywords: Leukocyte epigenetic aging; occupation; firefighters; firefighting service.

Evidence Level: 4A

Link:

https://journals.lww.com/joem/Fulltext/2023/05000/Occupational_Years_of_Service_and_Leukocyte.19.aspx

Work Health and Safety

This month we explore the association of work-related head injury in different industry sectors and the relationship between occupational lifting and risk of long-term sickness absence. In Covid-19 related research we explore the relationship between personal protective equipment simulation training and occupational exposures on Covid-19 infection and the relationship between climate change, workplace accidents and Covid-19

Work-related head injury and industry sectors in Finland: Causes and circumstances

Background: Despite the continuous development of occupational safety, the prevalence of work-related head injuries is excessive. To promote prevention, we conducted a study evaluating the risks and pathways that precede head injuries in different economic activity sectors. **Method:** In Finland, more than 90% of employees are covered by inclusive statutory workers' compensation. We obtained data on occupational head injuries in 2010-2017 from an insurance company database. The European Statistics on Accidents at

Work (ESAW) variables represented the characteristics of the accidents and the injury. We analysed the risk factors, contributing events and injury mechanisms in 20 industry sectors, based on the Statistical Classification of Economic Activities in the European Community (NACE). **Results:** In the 32,898 cases, the most commonly affected area was the eyes (49.6%). The highest incidence of head injuries was in construction (15.7 per 1000 insurance years). Construction, manufacturing, and human health and social work activities stood out due to their distinctive ESAW category counts. 'Working with hand-held tools' [risk ratio (RR) 2.23, 95% confidence interval (CI) 2.14-2.32] in construction and 'operating machines' (RR 3.32, 95% CI 3.01-3.66) and 'working with hand-held tools' (1.99, 1.91-2.07) in manufacturing predicted head injury. The risk related to parameters of violence and threats in health and social work activities was nearly ninefold the risk of other sectors. **Conclusion:** The risks and pathways preceding head injuries varied considerably. The highest head injury rates were in construction and manufacturing. Violence emerged as a major risk factor in human health and social work activities.

Heimonen et al. 2023.

International Archives of Occupational and Environmental Health, vol. 96, no. 4.

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Keywords: Construction industry; ESAW; head injury; health care; occupational accident; violence.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007/s00420-022-01950-9>

Duration and intensity of occupational lifting and risk of long-term sickness absence: Prospective cohort study with register follow-up among 45 000 workers

Background: This study aimed to investigate the prospective association of lifting duration and lifting load with the risk of long-term sickness absence (LTSA). **Method:** We followed manual workers with occupational lifting (N=45 346) from the Work Environment and Health in Denmark Study (2012-2018) for two years in a high-quality national register on social transfer payments (DREAM). Cox regressions with model-assisted weights were employed to estimate the risk of LTSA from lifting duration and loads.

Results: During follow-up, 9.6% of the workers had an episode of LTSA. Compared to workers with seldom lifting (reference), workers lifting $\frac{1}{2}$ and $\frac{3}{4}$ of the workday had increased risk of LTSA [hazard ratios (HR) of 1.36 [95% confidence interval (CI) 1.20-1.56] and 1.22 (95% CI 1.07-1.39)], respectively. Lifting load showed a positive exposure-response association with LTSA (trend test, $P < 0.01$), with HR for lifting 5-15, 16-29, and ≥ 30 kg at 1.11 (95% CI 1.02-1.22), 1.17 (95% CI 1.03-1.34), and 1.29 (95% CI 1.11-1.50), respectively. Age-stratified analyses showed increased risk of LTSA among workers ≥ 50 years with a high proportion of work-related lifting compared to their younger counterparts. **Conclusion:** Occupational lifting for $\frac{1}{2}$ the workday increased the risk of LTSA, while higher occupational lifting load exacerbated this risk in an exposure-response manner. The study underscores the importance of reducing both lifting duration and loads for prevention of LTSA at the workplace, especially among older workers.

Bláfoss et al. 2023.

Scandinavian Journal of Work, Environment and Health, vol. 49, no. 4.

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Keywords: Lifting; sickness absence; occupation; duration.

Evidence Level: 4B

Link: <https://www.sjweh.fi/article/4085>

Personal protective equipment simulation training is associated with lower COVID-19 infection among healthcare workers

Background: To describe the personal protective equipment training strategies during the beginning of the pandemic and to investigate the association between training and COVID-19 infection among healthcare workers. **Method:** This cross-sectional study conducted between March and May 2020 included 7,142 healthcare professionals who were eligible for both online and face-to-face simulation-based training on personal protective equipment use. Simulation training attendance was assessed by reviewing the attendance list, and the COVID-19 sick leave records recovered from the institutional RT-PCR database used to grant sick leave. The association between personal protective equipment training and COVID-19 was investigated using logistic regression, adjusted for sociodemographic and occupational characteristics.

Results: The mean age was 36.9 years (\pm 8.3), and 72.6% of participants were female. A total of 5,502 (77.0%) professionals were trained: 3,012 (54.7%) through online training, 691 (12.6%) through face-to-face training, and 1,799 (32.7%) through both strategies. During the study period, 584 (8.2%) COVID-19 cases were diagnosed among these professionals. The number of positive RT-PCR tests was 180 (11.0%) for untrained professionals, 245 (8.1%) for those trained only online, 35 (5.1%) for those trained face-to-face, and 124 (6.9%) for those trained with both strategies ($p < 0.001$). Participants who received face-to-face training had a 0.43 lower risk of contracting COVID-19. **Conclusion:** Personal protective equipment training decreased the odds of COVID-19 among healthcare professionals, with face-to-face simulation-based training being most effective.

Couto et al. 2023.

Einstein, vol. 21.

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Keywords: PPE, personal protective equipment; simulation training; COVID-19; healthcare workers.

Evidence Level: 4A

Link: <https://www.scielo.br/j/eins/a/X8X4ChtxmjsTjkLzGyYGT9g/?lang=en>

The impact of occupational exposures on infection rates during the COVID-19 pandemic: A test-negative design study with register data of 207 034 Dutch workers

Background: This study aimed to investigate the effects of occupational exposures on the risk of a positive COVID-19 test, and whether this differed across pandemic waves. **Method:** Data from 207 034 workers from The Netherlands with test data on COVID-19 from June 2020 until August 2021 were available. Occupational exposure was estimated by using the eight dimensions of a COVID-19 job exposure matrix (JEM). Personal characteristics, household composition and residence area were derived from Statistics Netherlands. A test-negative design was applied in which the risk of a positive test was analyzed in a conditional logit model. **Results:** All eight dimensions of occupational exposure included in the JEM increased the odds of a positive test for the entire study period and three pandemic waves [OR ranging from 1.09, (95% confidence interval (CI) 1.02-1.17) to 1.77 (95% CI 1.61-1.96)]. Adjusting for a previous positive test and other covariates strongly reduced the odds to be infected, but most dimensions remained at elevated risk. Fully adjusted models showed that contaminated work spaces and face covering were mostly relevant in the first two pandemic waves, whereas income insecurity showed higher odds in the third wave. Several occupations have a higher predicted value for a positive COVID-19 test, with variation over time. Discussion Occupational exposures are associated with a higher risk of a positive test, but variations over time exist in occupations with the highest risks. These findings provide insights for interventions among workers for future pandemic waves of COVID-19 or other respiratory epidemics.

Eekhout et al. 2023.

Scandinavian Journal of Work, Environment and Health, vol. 49, no. 4.

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Keywords: Infection; occupational exposures; COVID-19; pandemic.

Evidence Level: 4B

Link: <https://www.sjweh.fi/article/4086>

Work accidents, climate change and COVID-19

Background: The effects brought by climate change and the pandemic upon worker health and wellbeing are varied and necessitate the identification and implementation of improved strategic interventions. **Method:** This review aims, firstly, to assess how climate change affects occupational accidents, focusing on the impacts of extreme air temperatures and natural disasters; and, secondly, to analyze the role of the pandemic in this context. **Results:** Our results show that the manifestations of climate change affect workers physically while on the job, psychologically, and by modifying the work environment and conditions; all these factors can cause stress, in turn increasing the risk of suffering a work accident. There is no consensus on the impact of the COVID-19 pandemic on work accidents; however, an increase in adverse mental effects on workers in contact with the public (specifically in healthcare) has been described. It has also been shown that this strain affects the risk of suffering an accident. During the pandemic, many people began to work remotely, and what initially appeared to be a provisional situation has been made

permanent or semi-permanent in some positions and companies. However, we found no studies evaluating the working conditions of those who telework. In relation to the combined impact of climate change and the pandemic on occupational health, only publications focusing on the synergistic effect of heat due to the obligation to wear COVID-19-specific PPE, either outdoors or in poorly acclimatized indoor environments, were found. **Conclusion:** It is essential that preventive services establish new measures, train workers, and determine new priorities for adapting working conditions to these altered circumstances.

Santurtún et al. 2023.

The Science of the Total Environment, vol. 871.

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Keywords: Air temperature; climate change; COVID-19; mental health; natural disasters; work accidents.

Evidence Level: 6A

Link: <https://www.sciencedirect.com/science/article/pii/S0048969723007453?via%3Dihub>

Risk Assessment

Occupational health: The role of demographic factors in the condition of increased risk

Background: The paper analyses the impact of socio-demographic characteristics of the employees in conditions of uncertainty in the organizations. **Material and Method:** The study was conducted on a sample of 210 employees using the Mental Health Inventory - 38 (MHI-38), Satisfaction with life scale (SWLS), and the Center for Epidemiological Studies - Depression (CES-D). **Results:** The results showed that female respondents had significantly higher scores on ANX ($t = 2,278, p < 0.05$), while male employees had higher scores on life satisfaction ($t = 2.103, p < 0.05$). Older employees have a higher tendency for loss of emotional-behavioral control ($F = 4.427, p < 0.05$). Respondents who have satisfying living standards have also higher scores on SWLS ($t = 2.257, p < 0.05$). Respondents who have dissatisfying living standard have higher scores on generally positive affect ($t = 3.152, p < 0.01$), life satisfaction ($t = 3.571, p < 0.01$), psychological distress ($t = 2.929, p < 0.01$) and loss of emotional- behavioral control ($t = 2.361, p < 0.05$). Employees with different levels of educational background have similar tendencies in life satisfaction, mental health, and depressive symptoms ($p > 0.05$). **Conclusion:** The study showed that the specific socio-demographic profile of the employees is related to higher levels of mental health issues. Specifically, the mental health of female and older employees have been especially affected and disturbed by uncertain conditions. The results can be potentially used both in the terms of designing activities that support the mental health of the population, as well as in relation to the mental health of employees. *Int J Occup Med Environ Health. 2023;36(2):250-62.*

Sitarevic et al. 2023.

International Journal of Occupational Medicine and Environmental Health, vol. 36, no. 2.

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Keywords: Anxiety; condition of risk; depression symptoms; mental health; public health; satisfaction with life.

Evidence Level: 5B

Link: <http://ijomeh.eu/Occupational-health-the-role-of-demographic-factors-in-the-condition-of-increased,162270,0,2.html>

Chronic Health Issues

Assessment of medical and public assistance expenditures and employment among US adults with cancer diagnoses

Background: Prior research suggests significant social value associated with increased longevity due to preventing and treating cancer. Other social costs associated with cancer, such as unemployment, public medical spending, and public assistance, may also be sizable. **Objective:** To examine whether a cancer history is associated with receipt of disability insurance, income, employment, and medical spending.

Method: This cross-sectional study used data from the Medical Expenditure Panel Study (MEPS) (2010-

2016) for a nationally representative sample of US adults aged 50 to 79 years. Data were analyzed from December 2021 to March 2023. **Exposure:** Cancer history. **Main outcomes and measures:** The main outcomes were employment, public assistance receipt, disability, and medical expenditures. Variables for race, ethnicity, and age were used as controls. A series of multivariate regression models were used to assess the immediate and 2-year association of a cancer history with disability, income, employment, and medical spending. **Results:** Of 39 439 unique MEPS respondents included in the study, 52% were female, and the mean (SD) age was 61.44 (8.32) years; 12% of respondents had a history of cancer. Individuals with a cancer history who were aged 50 to 64 years were 9.80 (95% CI, 7.35-12.25) percentage points more likely to have a work-limiting disability and were 9.08 (95% CI, 6.22-11.94) percentage points less likely to be employed compared with individuals in the same age group without a history of cancer. Nationally, cancer accounted for 505 768 fewer employed individuals in the population aged 50 to 64 years. A cancer history was also associated with an increase of \$2722 (95% CI, \$2131-\$3313) in medical spending, \$6460 (95% CI, \$5254-\$7667) in public medical spending, and \$515 (95% CI, \$337-\$692) in other public assistance spending. **Conclusions and relevance:** In this cross-sectional study, a history of cancer was associated with increased likelihood of disability, higher medical spending, and decreased likelihood of employment. These findings suggest there may be gains beyond increased longevity if cancer can be detected and treated earlier.

Grabowski et al. 2023.

JAMA Network Open, vol. 6, no. 5.

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Keywords: Employment; public; medical assistance; cancer; US.

Evidence Level: 4B

Link: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2805325>

Occupational Exposure

This month we explore the occupational risk factors for bladder and prostate cancer, carcinogenic risk related to occupational carcinogenic exposure, hematological changes related to petrol exposure, exposure to pesticides as a risk for epilepsy and levels of benzene compounds and association with congenital heart disease.

Gene-occupation interactions: A review of the literature on bladder and prostate cancer

Background: Bladder cancer (BCa) and prostate cancer (PCa) are genitourinary cancers which constitute significant health problems in men and in which environmental factors play an important role. Understanding the genetic susceptibility to BCa or PCa and occupational exposure is paramount to improving cancer prevention and early detection. **Method:** The aim of this review article was to address the scientific evidence on the genetic risk factors and occupational exposure associated with the occurrence of BCa and PCa. The authors identified relevant original articles that have been published between 1994 and 2023. Variations of the following search terms: "gene" and "occupational" combined with one of the following terms: "bladder cancer" or "prostate cancer" were applied for the search purpose. **Results:** The authors found 342 publications of which 50 population studies met their requirements for gene-occupation interactions. In total, 34 full-text manuscripts were about BCa and 16 about PCa. These research examines the genes involved in detoxification processes of xenobiotics (glutathione S-transferase, N-acetyltransferase, cytochrome P450, UDP-glucuronosyltransferase), oxidative stress (glutathione peroxidase 1, manganese superoxide dismutase, catalase), altering DNA repair capacity (X-ray repair cross-complementing 1, base excision repair, nucleotide excision repair), tumour suppression (TP53 gene), and vitamin D pathway (vitamin D receptor gene). The role of genetic factors in the occupational exposure has not been conclusively established, but it appears the possibility of genetic involvement. **Conclusion:** Determination of environmentally responsive genes provides important mechanistic implications for the etiology of occupational cancers, and valuable input in occupational exposure limits set by taking genetic susceptibility into account. More genetic research is needed to corroborate these findings and assess their significance in the workplace.

Wieczorek et al. 2023.

Medycyna Pracy, vol. 74, no. 2.

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Keywords: Bladder cancer; gene; genetic susceptibility; occupational exposure; prostate cancer; workplace.

Evidence Level: 6A

Link: <http://medpr.imp.lodz.pl/Gene-occupation-interactions-a-review-of-the-literature-on-bladder-and-prostate-cancer,165982,0,2.html>

Hematological changes in gas station workers

Background: Benzene, toluene, and xylene isomers (BTX) are present in gasoline. Exposure to benzene may lead to the appearance of a series of signs, symptoms, and complications, which are characterized by benzene poisoning, which is an occupational disease. This study evaluated the presence of signs and symptoms related to occupational exposure and whether occupational exposure to BTX is associated with the development of hematological changes. **Material and Method:** This cross-sectional epidemiological study included 542 participants, in which 324 were gas station workers (GSWs) and 218 were office workers (OWs) with no occupational exposure to benzene. To characterize the type of exposure (exposed and not exposed), trans,trans-Muconic acid (tt-MA), Hippuric acid (HA), and Methylhippuric acid (MHA) were used as exposure biomarkers. The tt-MA analysis revealed that the GSWs had 0.29 mg/g of urinary creatinine and the OWs had 0.13 mg/g of urinary creatinine. For HA, the GSWs presented 0.49 g/g of creatinine while the OWs presented 0.07. MHA analysis revealed that the GSWs had 1.57 g/g creatinine and the OWs had 0.01 g/g creatinine. Occupation habits and clinical symptoms were collected by questionnaire and blood samples were analyzed for hematological parameters. The persistence of hematological changes was evaluated with three serial blood collections every 15 days followed by laboratory hematological analysis. A descriptive analysis by the Chi-square test method was performed to evaluate the association between occupational exposure to fuels and the occurrence of changes in hematological parameters. **Results:** In the GSWs, the most described signs and symptoms were somnolence (45.1%), headache (38.3%), dizziness (27.5%), tingling (25.4%), and involuntary movement (25%). Twenty GSWs that presented hematological alterations performed serial collections fifteen days apart. In addition, these workers presented total leukocyte counts above the upper limit and lymphocyte counts close to the lower limit. Leukocytosis and lymphopenia are hematological alterations present in chronic benzene poisoning. **Conclusion:** The results found an initial change in different hematological parameters routinely used in clinics to evaluate health conditions. These findings reveal the importance of valuing clinical changes, even in the absence of disease, during the health monitoring of gas station workers and other groups that share the same space.

Giardini et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: Benzene; clinical laboratory techniques; filling station attendants; gas stations; hematology; occupational exposure.

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/20/10/5896>

Assessment of occupational carcinogenic risk by comparing data from the Italian register of occupational exposures to carcinogens (sirep) with the international agency for research on cancer (iarc) evidence

Background: In Italy, the National Register on Occupational Exposure to Carcinogens (SIREP) is established pursuant to article 243 of Legislative Decree 81/2008 and is aimed to collect information on the exposure of workers to carcinogens transmitted by employers. **Method:** The aim of this study is to assess its level of implementation comparing prevailing carcinogens reported in SIREP with the monitoring of risks in the workplace evidenced by the International Agency for Research on Cancer (IARC). The data reported in the SIREP have been integrated with IARC and the database on carcinogenic risk in the workplace named MATline in order to build a matrix containing the carcinogens classified according to the IARC (Group 1 and 2A agents) and to a semi-quantitative indicator of risk level (High or Low) calculated upon the number of exposures reported in SIREP. The matrix contains the following data: carcinogens, economic sector (NACE

Rev2 coding) and cancer sites. **Results and Conclusion:** The comparison between SIREP and IARC evidence allowed us to highlight situations with a high risk of carcinogenicity and to address appropriate actions of prevention to contain the risks of exposure to carcinogenic substances.

Paris et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: Carcinogens; health surveillance; occupational exposure; registration system; risk assessment.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/20/10/5850>

Occupational exposure to pesticides as a potential risk factor for epilepsy

Background: Epilepsy is a chronic neurological disorder in which brain activity becomes abnormal, causing seizures. In a previous study we found that environmental exposure to pesticides was associated with a greater risk of epilepsy. The present study examined possible occupational risk factors that may contribute to the occurrence of epilepsy in farmers and pesticide applicators (sprayers). **Method:** A case-referent study was conducted on 19,704 individuals over a 17-year study period (2000-2016). Epilepsy cases (n = 5091) were collected from Hospital records and referents (non-epilepsy cases, n = 14,613) from the Centre for Prevention of Occupational Risks, both from Almería (South-Eastern Spain). **Results:** A significant increased risk of having epilepsy was found in farmers working in intensive agriculture (high-yield greenhouse crops) compared to extensive agriculture (open-air crops). The risk was greater for farmers residing in rural areas with high pesticide use (intensive farming crops in plastic greenhouses) and for those not wearing protective gloves. As for sprayers, the greatest risk of epilepsy was observed in those not wearing face mask, and in those living in areas with high pesticide use (greenhouse intensive agriculture).

Conclusion: Overall, this study supports previous findings on the association between epilepsy and pesticide exposure in the general population, and extends the risk to farmers occupationally exposed to pesticides, mainly those engaged in intensive agriculture.

Alarcón et al. 2023.

NeuroToxicology, vol. 96.

User License: *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)* (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords: Epilepsy; farmers; occupational exposure; personal protective equipment; pesticide applicators; pesticides.

Evidence Level: 4B

Link: <https://www.sciencedirect.com/science/article/pii/S0161813X23000591?via%3Dihub>

Maternal environmental, occupational, and urinary metabolite levels of benzene compounds and their association with congenital heart diseases in offspring: A case-control study in China

Background: The conclusions about the association of maternal pregnancy environment, occupation, and benzene compounds with fetal CHD are not entirely consistent. **Method:** Eight hundred seven CHD cases and 1008 controls were included in this study. All occupations were classified and coded against the Occupational Classification Dictionary of the People's Republic of China (2015 version). Logistic regressions were used to explore the correlation among environmental factors, occupation types, and CHDs in offspring. **Results:** We found that living near public facilities and having exposure to chemical reagents and hazardous substances were significant risk factors for CHDs in offspring. We found that offspring of mothers who worked in agriculture and similar work during pregnancy suffered from CHD. The risk of all CHDs in the offspring of pregnant women working in production manufacturing and related work was significantly higher than that in unemployed pregnant women, the risk was also observed in 4 subtypes of CHDs. We compared the concentrations of the five metabolite (MA, mHA, HA, PGA, and SPMA) levels of benzene compounds in the urine of mothers in case and control groups and found no significant differences. **Conclusion:**

Our study suggests that maternal exposure during pregnancy and certain environmental and occupational conditions are risk factors for CHD in offspring, but did not support an association between concentrations of metabolites of benzene compounds in the urine of pregnant women and CHDs in their offspring.

Wang et al. 2023.

Environmental Science and Pollution Research, vol. 30, no. 24.

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Keywords: Benzene compound metabolites; congenital heart defects; environmental factors; maternal occupation; pregnancy.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007/s11356-023-27015-z>

Sedentary Practices

Feasibility of using mobile standing desks to address sedentary behavior in flexible work environments: A mixed methods study

Background: The purpose of this study was to determine the feasibility of using mobile standing desks to address work-related sedentary behavior for adults working in flexible positions. **Method:** University employees (N = 20) in flexible positions used a mobile standing desk for 8 weeks and completed one focus group. Paired t tests were used to determine differences in workplace behavior. Focus group transcripts were analyzed using thematic analysis. **Results:** Work-related sitting decreased (P = 0.010, -45.88 minutes) and standing increased (P = 0.016, +41.28 minutes). Advantages included mobility, enhanced attention to tasks, and ease of use. Disadvantages included the device's design, built environment barriers, and impact of work/life circumstances. **Conclusion:** The mobile standing desk resulted in a decrease in sitting consistent with traditional standing desk-based interventions. Future interventions should consider including goal setting, reminders, feedback, and incentives.

Wilkerson et al. 2023.

Journal of Occupational and Environmental Medicine,

User License: *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)* (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords: Sedentary behavior; flexible working environments; mobile standing desks.

Evidence Level: 5A

Link:

https://journals.lww.com/joem/Fulltext/2023/05000/Feasibility_of_Using_Mobile_Standing_Desks_to.13.aspx

Physical Activity

This month we explore the impact of sit stand desks on physical behavior, the effect of work-related and commuting physical activity during transition to retirement and employment conditions and leisure time physical activity. In Covid-19 related research we explore the mental conditions and physical activity of workers during the pandemic

Mental condition and physical activity of individuals working during the COVID-19 pandemic in Poland

Background: The study assessed quality of life and depression in working people during COVID-19 pandemic, relative to their physical activity. **Material and Method:** The study involved 1194 people living in south-eastern Poland, and assessed life satisfaction (Life Satisfaction Questionnaire - 9 [LISAT-9]), quality of life (World Health Organization Quality of Life - BREF [WHOQoL-BREF]), depression (Beck Depression Inventory [BDI]) and physical activity. **Results:** The respondents on average scored 4.32 in LISAT-9; respectively 66.2, 68.3, 69.6 and 63.5 in physical, psychological, social and environment domains of WHOQoL-BREF and 9.2 in BDI. Regularly performed physical activity positively affected the scores in all the psychometric tests in women with higher and secondary education and in men with vocational education. Women presented lower life satisfaction, poorer quality of life and higher level of depression than men. The psychometric scores were also differentiated by type of employment and job. Depression was identified in 44% of all the respondents. **Conclusion:** Individuals who are economically active during the pandemic report good quality of life and no or only mild signs of depression. Working people with higher

education cope more effectively with adversities of the pandemic, compared to those with lower education. *Int J Occup Med Environ Health*. 2023;36(2):274-90.

Zwolińska et al. 2023.

International Journal of Occupational Medicine and Environmental Health, vol. 36, no. 2.

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Keywords: COVID-19; depression; life satisfaction; occupational medicine; physical activity; quality of life.

Evidence Level: 4B

Link: <http://ijomeh.eu/Mental-condition-and-physical-activity-of-individuals-working-during-the-COVID-19,162888,0,2.html>

Impact of sit-to-stand and treadmill desks on patterns of daily waking physical behaviors among overweight and obese seated office workers: Cluster randomized controlled trial

Background: Sit-to-stand and treadmill desks may help sedentary office workers meet the physical activity guideline to "move more and sit less," but little is known about their long-term impact on altering the accumulation patterns of physical behaviors. **Objective:** This study explores the impact of sit-to-stand and treadmill desks on physical behavior accumulation patterns during a 12-month multicomponent intervention with an intent-to-treat design in overweight and obese seated office workers. **Method:** In total, 66 office workers were cluster randomized into a seated desk control (n=21, 32%; 8 clusters), sit-to-stand desk (n=23, 35%; 9 clusters), or treadmill desk (n=22, 33%; 7 clusters) group. Participants wore an activPAL (PAL Technologies Ltd) accelerometer for 7 days at baseline, 3-month follow-up (M3), 6-month follow-up (M6), and 12-month follow-up (M12) and received periodic feedback on their physical behaviors. Analyses of physical behavior patterns included total day and workday number of sedentary, standing, and stepping bouts categorized into durations ranging from 1 to 60 and >60 minutes and usual sedentary, standing, and stepping bout durations. Intervention trends were analyzed using random-intercept mixed linear models accounting for repeated measures and clustering effects. **Results:** The treadmill desk group favored prolonged sedentary bouts (>60 min), whereas the sit-to-stand desk group accrued more short-duration sedentary bouts (<20 min). Therefore, compared with controls, sit-to-stand desk users had shorter usual sedentary bout durations short-term (total day $\Delta M3$: -10.1 min/bout, 95% CI -17.9 to -2.2; $P=.01$; workday $\Delta M3$: -20.3 min/bout, 95% CI -37.7 to -2.9; $P=.02$), whereas treadmill desk users had longer usual sedentary bout durations long-term (total day $\Delta M12$: 9.0 min/bout, 95% CI 1.6-16.4; $P=.02$). The treadmill desk group favored prolonged standing bouts (30-60 min and >60 min), whereas the sit-to-stand desk group accrued more short-duration standing bouts (<20 min). As such, relative to controls, treadmill desk users had longer usual standing bout durations short-term (total day $\Delta M3$: 6.9 min/bout, 95% CI 2.5-11.4; $P=.002$; workday $\Delta M3$: 8.9 min/bout, 95% CI 2.1-15.7; $P=.01$) and sustained this long-term (total day $\Delta M12$: 4.5 min/bout, 95% CI 0.7-8.4; $P=.02$; workday $\Delta M12$: 5.8 min/bout, 95% CI 0.9-10.6; $P=.02$), whereas sit-to-stand desk users showed this trend only in the long-term (total day $\Delta M12$: 4.2 min/bout, 95% CI 0.1-8.3; $P=.046$). The treadmill desk group accumulated more stepping bouts across various bins of duration (5-50 min), primarily at M3. Thus, treadmill desk users had longer usual stepping bout durations in the short-term compared with controls (workday $\Delta M3$: 4.8 min/bout, 95% CI 1.3-8.3; $P=.007$) and in the short- and long-term compared with sit-to-stand desk users (workday $\Delta M3$: 4.7 min/bout, 95% CI 1.6-7.8; $P=.003$; workday $\Delta M12$: 3.0 min/bout, 95% CI 0.1-5.9; $P=.04$). **Conclusion:** Sit-to-stand desks exerted potentially more favorable physical behavior accumulation patterns than treadmill desks. Future active workstation trials should consider strategies to promote more frequent long-term movement bouts and dissuade prolonged static postural fixity.

Arguello et al. 2023.

Journal of Medical Internet Research, vol. 25.

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Keywords: Move more and sit less; physical activity promotion; prolonged sedentary behavior; seated office workers; sedentary behavior; sit-to-stand desks; treadmill desks; workplace wellness.

Evidence Level: 2A

Link: <https://www.jmir.org/2023/1/e43018>

Does work-related and commuting physical activity predict changes in physical activity and sedentary behavior during the transition to retirement? GPS and accelerometer study

Background and Method: We examined how GPS and accelerometer measured work-related and commuting physical activity contribute to changes in physical activity and sedentary behavior during the retirement transition in the Finnish Retirement and Aging study (n = 118). **Results:** Lower work-related activity was associated with a decrease in sedentary time and an increase in light physical activity during retirement. Conversely, higher work-related activity was associated with an increase in sedentary time and a decrease in light physical activity, except among those active workers who also were active commuters. **Conclusion:** Thus, both work-related and commuting physical activity predict changes in physical activity and sedentary behavior when retiring.

Pasanen et al. 2023.

Health and Place, vol. 81.

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Keywords: Active commute; activity locations; occupational physical activity; physical activity; retirement.

Evidence Level: 4B

Link: <https://www.sciencedirect.com/science/article/pii/S135382922300062X?via%3Dihub>

Employment conditions and leisure-time physical activity among Korean workers: A longitudinal study (2009-2019)

Background: Employment conditions may affect individuals' leisure-time physical activity (LTPA). We aimed to examine the relationship between changes in working and employment conditions and LTPA among working-age populations in South Korea from 2009 to 2019. **Method:** A cohort of 6,553 men and 5,124 women aged 19-64 years was analyzed using linear individual-level fixed-effects regressions to examine changes in working and employment conditions with changes in LTPA. **Results:** Reduced working hours, labor union membership, and part-time work were associated with increased LTPA for both sexes. Manual labor and self-reported precarious work were associated with reduced LTPA. The longitudinal relationship between employment conditions and LTPA was clear in men, but less apparent in women. **Conclusion:** Changes in working and employment conditions had longitudinal associations with changes in LTPA among working-age Koreans. Future research should examine changing employment conditions and their effect on LTPA, particularly among women and manual/precarious workers. These results could inform effective planning and interventions to increase LTPA.

Kim et al. 2023.

BMC Public Health, vol. 23, no. 1.

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Keywords: Employment condition; leisure-time physical activity; longitudinal study; South Korea; working condition.

Evidence Level: 4B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15766-w>

Musculoskeletal Health

This month we explore the relationship between musculoskeletal health and whole-body stretching exercises during lunch break, passive upper-limb exoskeletons, and warm-up interventions. We also explore risk factors for rotator cuff syndrome. In Covid-19 related research we explore the relationship between musculoskeletal health and working from home

Effects of whole-body stretching exercise during lunch break for reducing musculoskeletal pain and physical exertion among healthcare professionals

Background: To investigate the effect of whole-body stretching (WBS) exercise during lunch break for reducing musculoskeletal pain and physical exertion among healthcare professionals. **Method:** Full-time healthcare professionals working in hospitals with more than one year of experience were invited to participate. Sixty healthcare professionals (age 37.15 ± 3.9 Years, height 1.61 ± 0.04 m, body mass $67.8 \pm$

6.3 kg, and BMI 26.5 ± 2.1 kg/m²) participated in this single-blinded, two-arm randomized controlled trial (RCT). Participants were divided into WBS ($n = 30$) and control ($n = 30$) groups. The WBS group performed a range of stretching exercises targeting the entire body during a lunch break period for 3 times a week for 6 weeks. The control group received an education program. Musculoskeletal pain and physical exertion were assessed using the Nordic musculoskeletal questionnaire and Borg rating of perceived exertion scale, respectively. **Results:** The 12-month prevalence of musculoskeletal discomfort among all healthcare professionals was highest in the low back region (46.7%), followed by the neck (43.3%), and then the knee (28.3%). About 22% of participants said that their neck discomfort impacted their job, while about 18% reported that their low back pain impacted their job. Results indicate that the WBS and education program had a beneficial impact on pain and physical exertion ($p < 0.001$). When comparing the two groups, the WBS group experienced a significantly greater decrease in pain intensity (mean difference 3.6 vs. 2.5) and physical exertion (mean difference 5.6 vs. 4.0) compared to an education program only. **Conclusion:** This study suggests that doing WBS exercises during lunchtime can help lessen musculoskeletal pain and fatigue, making it easier to get through the workday.

Alqhtani et al. 2023.

Medicina, vol. 59, no. 5.

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Keywords: Lunch break; musculoskeletal discomfort; pain; physical exertion; stretching; whole-body.

Evidence Level: 2B

Link: <https://www.mdpi.com/1648-9144/59/5/910>

Efficacy of passive upper-limb exoskeletons in reducing musculoskeletal load associated with overhead tasks

Background: Overhead work can pose substantial musculoskeletal stress in many industrial settings. This study aimed to evaluate the efficacy of passive upper-limb exoskeletons in reducing muscular activity and subjective discomfort ratings. **Method:** In a repeated-measures laboratory experiment, 20 healthy male participants performed 10-min drilling tasks with and without two passive upper-limb exoskeletons (VEX and Airframe). During the tasks, muscle activity in eight muscles (upper limb - upper trapezius, middle deltoid, biceps brachii, triceps brachii; low back - erector spinae; lower limb - rectus femoris, biceps femoris, tibialis anterior) was collected using electromyography as a physical exertion measure. Subjective discomfort rating in six body parts was measured using the Borg's CR-10 scale. **Results:** The results showed that muscle activity (especially in the upper-limb muscles) was significantly decreased by 29.3-58.1% with both exoskeletons compared to no exoskeleton condition. The subjective discomfort ratings showed limited differences between the conditions. **Conclusion:** These findings indicate that passive upper-limb exoskeletons may have potential as an effective intervention to reduce muscular loading and physical exertion during overhead work.

Kong et al. 2023.

Applied Ergonomics, vol. 109.

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Keywords: Electromyography; ergonomic intervention; overhead work; shoulder assist; work related musculoskeletal disorders (WMSDs).

Evidence Level: 3A

Link: <https://www.sciencedirect.com/science/article/pii/S0003687023000030?via%3Dihub>

Effectiveness of warm-up interventions on work-related musculoskeletal disorders, physical and psychosocial functions among workers: A systematic review

Background: The aim of this systematic review was to identify from published literature the available evidence regarding the effects of warm-up intervention implemented in the workplace on work-related musculoskeletal disorders (WMSDs) and physical and psychosocial functions. **Design:** Systematic review. **Data sources:** The following four electronic databases were searched (from inception onwards to October 2022): Cochrane Central Register of Controlled Trials (CENTRAL), PubMed (Medline), Web of Science and Physiotherapy Evidence Database (PEDro). **Eligibility criteria:** Randomised and non-randomised controlled

studies were included in this review. Interventions should include a warm-up physical intervention in real-workplaces. **Data extraction and synthesis:** The primary outcomes were pain, discomfort, fatigue and physical functions. This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and used the Grading of Recommendations, Assessment, Development and Evaluation evidence synthesis. To assess the risk of bias, the Cochrane ROB2 was used for randomised controlled trial (RCT) and the Risk Of Bias In Non-randomised Studies-of Interventions was used for the non-RCT studies. **Results:** Three studies met the inclusion criterion, one cluster RCT and two non-RCTs. There was an important heterogeneity in the included studies principally concerning population and warm-up intervention exercises. There were important risks of bias in the four selected studies, due to blinding and confounding factors. Overall certainty of evidence was very low. **Conclusion:** Due to the poor methodological quality of studies and conflicting results, there was no evidence supporting the use of warm-up to prevent WMSDs in the workplace. The present findings highlighted the need of good quality studies targeting the effects of warm-up intervention to prevent WMSDs.

Larinier et al. 2023.

BMJ Open, vol. 13, no. 5.

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Keywords: Musculoskeletal disorders; occupational & industrial medicine; pain management; sports medicine.

Evidence Level: 1A

Link: <https://bmjopen.bmj.com/content/13/5/e056560.long>

Work-related risk factors for rotator cuff syndrome in a prospective study of manufacturing and healthcare workers

Background: This prospective study assessed the risk of developing rotator cuff syndrome (RCS) with separate or specific combinations of biomechanical exposures measures, controlling for individual confounders. Compared with other musculoskeletal disorders, rates of work-related shoulder musculoskeletal disorders have been declining more slowly. **Method:** We conducted up to 2 years of individual, annual assessments of covariates, exposures, and health outcomes for 393 U.S. manufacturing and healthcare workers without RCS at baseline. Task-level biomechanical exposures assessed exposure to forceful exertions (level, exertion rates, duty cycles), vibration, and upper arm postures (flexion, abduction). Hazard ratios (HRs) were calculated with Cox proportional hazard models. **Results:** We observed 39 incident RCS cases in 694 person-years (incidence rate = 5.62 per 100 person-years). Adjusting for confounders, we found increased risk of incident RCS associated with forceful hand exertions per minute for three upper arm posture tertiles: flexion $\geq 45^\circ$ ($\geq 28.2\%$ time, HR = 1.11, CI [1.01, 1.22]), abduction $\geq 30^\circ$ (11.9-21.2%-time, HR = 1.18, CI [1.04, 1.34]), and abduction $> 60^\circ$ ($\geq 4.8\%$ time, HR = 1.16, CI [1.04, 1.29]). We failed to observe statistically significant effects for other interactions or any separate measures of biomechanical exposure. **Conclusion:** This study highlights the importance of assessing combinations of exposure to forceful repetition and upper arm elevation when developing interventions for preventing RCS. Based on these results, interventions that reduce exposure to forceful repetition (i.e., lower force levels and/or slower exertion rates) may reduce the risk of RCS, especially when upper arm elevation cannot be avoided.

Meyers et al. 2023.

Human Factors, vol. 65, no. 3.

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Keywords: Ergonomics; incidence; musculoskeletal diseases; occupational diseases; posture; repetition; rotator cuff syndrome; rotator cuff tendinopathy; shoulder pain; work-related factors.

Evidence Level: 4A

Link: <https://pubmed.ncbi.nlm.nih.gov/34148475/>

The longitudinal association between working from home and musculoskeletal pain during the COVID-19 pandemic

Background: This study investigates the associations between working from home and the presence of MSP during the COVID-19 pandemic. Working from home often involves a lot of sedentary computer screen work and the home working environment might not be optimally equipped, which can lead to health problems, including musculoskeletal pain (MSP). **Method:** Longitudinal data from 16 questionnaire rounds of the Lifelines COVID-19 cohort during the first year of the COVID-19 pandemic (March 2020-February 2021) were used. In total, 40,702 Dutch workers were included. In every round, participants reported whether they worked on location, from home, or hybrid. Logistic Generalized Estimating Equations were used to study the association of work situation with the presence of MSP and the presence of severe MSP. **Results:** Working from home was associated with higher risks of having MSP in the lower back (OR: 1.05, 95% CI 1.02-1.08), in the upper back (OR: 1.24, 95% CI 1.18-1.31), and in the neck, shoulder(s) and/or arm(s) (OR: 1.18, 95% CI 1.13-1.22). Hybrid working was associated with higher risks of having pain in the upper back (OR: 1.09, 95% CI 1.02-1.17) and in the neck, shoulder(s) and/or arm(s) (OR: 1.14, 95% CI 1.09-1.20). Both home and hybrid workers had higher risks of severe MSP in the different body areas.

Conclusion: Home workers, and to a smaller extent hybrid workers, had higher risks of having MSP than location workers during the first year of the COVID-19 pandemic. The results indicate the importance of measures to prevent MSP in future policies involving working from home.

Bosma et al. 2023.

International Archives of Occupational and Environmental Health, vol. 96, no. 4.

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Keywords: COVID-19 pandemic; longitudinal data; musculoskeletal pain; working from home.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007/s00420-022-01946-5>

Guiding and Supporting Mental Health and Wellbeing

Mental Health

This month we explore the relationship between mental health and self-employment, post-traumatic stress amongst firefighters, integrated mental healthcare and vocational rehabilitation and perspectives on workplace disclosure of serious mental illness. In Covid-19 related research we explore employees' support strategies for mental wellbeing during the pandemic

Workers' perspectives on workplace disclosure of serious mental illness and their employers' responses

Background and Method: This paper explores workplace disclosure of serious mental illness and their employers' responses amongst a cohort of 40 workers, who were currently or formerly employed in a mainstream, regular job, post-onset of mental illness using semi-structured interviews

Results and Conclusion: There were five mutually exclusive disclosure contexts: seeking job accommodations, seeking protection, seeking understanding, responding to an employer's symptom-based inquiries, or being exposed by a third party or event.

White et al. 2023.

Qualitative Health Research, vol. 33, no. 6.

Keywords: Disclosure; employment; mental disorders; severe; truth; work.

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10202847/>

Employees' support strategies for mental wellbeing during and beyond the COVID-19 pandemic:

Recommendations for employers in the UK workforce

Background: Throughout the COVID-19 pandemic, and beyond for many businesses, employees have had to adapt to new ways of working due to disruptions in traditional practices. It is therefore crucial to understand the new challenges that employees are facing when it comes to taking care of their mental

wellbeing at work. **Method:** To that end, we distributed a survey to full-time UK employees (N = 451) to explore how supported they felt throughout the pandemic, and to identify whether there are any additional types of support they would like to receive. We also compared employees' intentions to seek help before versus during the COVID-19 pandemic, and assessed their current attitudes toward mental health. **Results:** Based on direct employee feedback, our results show remote workers felt more supported throughout the pandemic compared to hybrid workers. We also found that employees who had previously experienced an episode of anxiety or depression were significantly more likely to want extra support at work compared to those who had not. Furthermore, employees were significantly more likely to seek help for their mental health during the pandemic compared to before. Interestingly, the largest increase in intentions to seek help during the pandemic compared to before was with digital health solutions. Finally, we found that the strategies managers have adopted to better support their employees, an employee's mental health history, and their attitude to mental health all contributed to significantly increasing the likelihood that an employee would disclose a mental health concern to their line manager. **Conclusion:** We provide recommendations that encourage organisations to make changes to better support their employees, and we highlight the importance of mental health awareness training for both managers and employees. This work is of particular interest to organisations who are looking to tailor their current employee wellbeing offer to a post-pandemic world.

Bailey et al. 2023.

PLoS One, vol. 18, no. 5.

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Keywords: Mental wellbeing; support; employees; COVID-19; pandemic; UK.

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285275>

The impact of self-employment on mental health of the younger elderly in China

Background: With the prolongation of the life expectancy of the Chinese population and the intensification of the aging process of the population, the mental health problems of the elderly have become increasingly prominent. This study aims to explore whether self-employment can promote and how to promote the mental health of the elderly. **Method:** Based on the 2018 China Longitudinal Aging Social Survey (CLASS) data, this paper uses OLS model and KHB method to verify the impact of self-employment on the mental health of the younger elderly and its mechanism. **Results:** The results indicate that self-employment can significantly reduce the depression tendency of the younger elderly and promote their mental health. Heterogeneity analysis shows that self-employment has a more significant positive impact on the mental health of the younger elderly who are self-rated healthy, free of chronic diseases and low-level medical service utilization. The mechanism shows that self-employment can indirectly improve the mental health of the younger elderly through income growth effect and self-worth realization effect, in which the self-worth realization effect is greater than the economic effect. It illustrates that with the development of China's economy, the elderly are pursuing more intrinsic values brought by self-employment than economic benefits. **Conclusion:** In view of the above research results, it is suggested to encourage the elderly to actively participate in social activities, provide policy support for the younger elderly to engage in self-employment, increase government support as well as health guarantee level, and improve the subjective initiative of the elderly to participate in self-employment, so that the society can truly realize the healthy aging of "being useful and productive for the elderly".

Zhou et al. 2023.

BMC Geriatrics, vol. 23, no. 1.

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Keywords: Mental health; self-employment; self-realization; younger elderly.

Evidence Level: 4B

Link: <https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-023-03948-5>

Post-traumatic stress disorder and depressive symptoms among firefighters: A network analysis

Background: Firefighters, as first responders with a high risk of occupational exposure to traumatic events and heavy working stress, have a high prevalence of PTSD symptoms and depressive symptoms. But no

previous studies analyzed the relationships and hierarchies of PTSD and depressive symptoms among firefighters. Network analysis is a novel and effective method for investigating the complex interactions of mental disorders at the symptom level and providing a new understanding of psychopathology. The current study was designed to characterize the PTSD and depressive symptoms network structure in the Chinese firefighters. **Method:** The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5) and the Self-Rating Depression Scale (SDS) were applied to assess PTSD and depressive symptoms, respectively. The network structure of PTSD and depressive symptoms was characterized using "expected influence (EI)" and "bridge EI" as centrality indices. The Walktrap algorithm was conducted to identify communities in the PTSD and depressive symptoms network. Finally, Network accuracy and stability were examined using the Bootstrapped test and the case-dropping procedure. **Results:** A total of 1,768 firefighters were enrolled in our research. Network analysis revealed that the relationship between PTSD symptoms, "Flashback" and "Avoidance," was the strongest. "Life emptiness" was the most central symptom with the highest EI in the PTSD and depression network model. Followed by "Fatigue" and "Interest loss." Bridge symptoms connecting PTSD and depressive symptoms in our study were "Numb," "High alertness," "Sad mood," and "Compunction and blame," successively. The data-driven community detection suggested the differences in PTSD symptoms in the clustering process. The reliability of the network was approved by both stability and accuracy tests. **Conclusion:** To the best of our knowledge, the current study first demonstrated the network structure of PTSD and depressive symptoms among Chinese firefighters, identifying the central and bridge symptoms. Targeting interventions to the symptoms mentioned above may effectively treat firefighters suffering from PTSD and depressive symptoms.

Cheng et al. 2023.

Frontiers in Public Health, vol. 11.

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Keywords: Depression; firefighter; mental health; network analysis; post-traumatic stress disorder.

Evidence Level: 4A

Link: <https://www.frontiersin.org/articles/10.3389/fpubh.2023.1096771/full>

Integrated mental healthcare and vocational rehabilitation for people on sick leave with stress-related disorders: 24-month follow-up of the randomized IBBIS trial

Background: Integrating vocational rehabilitation and mental healthcare has shown effects on vocational outcomes during sick leave with common mental disorders. In a previous paper, we showed that a Danish integrated healthcare and vocational rehabilitation intervention (INT) had a surprisingly negative impact on vocational outcomes compared to service as usual (SAU) at 6- and 12-month follow-up. That was also the case with a mental healthcare intervention (MHC) tested in the same study. This article reports the 24-month follow-up results of that same study. **Method:** A randomized, parallel-group, three-arm, multi-centre superiority trial was conducted to test the effectiveness of INT and MHC compared to SAU.

Results: In total, 631 persons were randomized. Contrary to our hypothesis, SAU showed faster return to work than both INT [hazard rate (HR) 1.39, P=0.0027] and MHC (HR 1.30, P=0.013) at 24-month follow-up. Overall, no differences were observed regarding mental health and functional level. Compared to SAU, we observed some health benefits of MHC, but not INT, at 6-month follow-up but not thereafter, and lower rates of employment at all follow-ups. Since implementation problems might explain the results of INT, we cannot conclude that INT is no better than SAU. The MHC intervention was implemented with good fidelity and did not improve return to work. **Conclusion:** This trial does not support the hypothesis that INT lead to faster return to work. However, implementation failure may explain the negative results.

Hoff et al. 2023.

Scandinavian Journal of Work, Environment and Health, vol. 49, no. 4.

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

Keywords: Mental healthcare; sick leave; vocational rehabilitation; stress-related disorders.

Evidence Level: 2B

Link: <https://www.sjweh.fi/article/4084>

Bullying, Harassment and Occupational violence

This month we explore workplace bullying among healthcare professionals and the effect of the workplace environment. In Covid-19 related research we explore the relationship between working from home and intimate partner violence among cis-women during the Covid-19 pandemic.

Workplace bullying among healthcare professionals: A quanti-qualitative survey in a sample of women working in an Italian healthcare setting

Background: The main objective of this study was to analyze, in a sample of female healthcare workers in Italy, the training needs to improve positive relationships in the healthcare organization. **Method:** To better understand these needs, perceived workplace bullying and its consequences in terms of professional commitment and well-being were analyzed from a descriptive and quantitative perspective (or mixed-methods analysis). A questionnaire was completed online in a healthcare facility in northwestern Italy.

Results: The participants were 231 female employees. The quantitative data showed that, on average, the sampled population perceived a low burden of WPB. The majority of the sample expressed moderate engagement at work and moderate perception of psychological well-being. It is interesting to note that one element seemed to be overarching in the responses to the open-ended questions: communication, which emerged as a problematic element that affects the entire organization. **Conclusion:** The research data provide useful evidence for intervention in favor of an environment that helps to recognize the phenomenon and intervene in time, offering the possibility of accepting the discomfort and fatigue of healthcare workers and offering useful interventions to the individual and the team.

Acquadro Maran et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: Healthcare organization; mix method; well-being; women; workplace bullying.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/20/10/5859>

Working from home and intimate partner violence among cis-women during the COVID-19 pandemic: Evidence from a global, cross-sectional study

Background: Intimate partner violence (IPV) may have been exacerbated during the COVID-19 pandemic. This analysis aimed to determine how employment disruption during COVID-19, including working from home, was associated with IPV experience among cis-gendered women. **Method:** The International Sexual Health and Reproductive health (I-SHARE) study is a cross-sectional online survey implemented in 30 countries during the pandemic. Samples used convenience, online panel, and population-representative methods. IPV was a pre-specified primary outcome, measured using questions from a validated World Health Organisation instrument. Conditional logistic regression modelling was used to quantify the associations between IPV and changes to employment during COVID-19, adjusted for confounding.

Results: 13,416 cis-gender women, aged 18-97, were analysed. One third were from low and middle income countries, and two thirds from high income countries. The majority were heterosexual (82.7%), educated beyond secondary-level (72.4%) and childless (62.7%). During COVID-19 33.9% women worked from home, 14.6% lost employment, and 33.1% continued to work on-site. 15.5% experienced some form of IPV. Women working from home experienced greater odds of IPV than those working on-site (adjusted OR 1.40, 95% CI 1.12-1.74, p = 0.003). This finding was robust independent of sampling strategy and country income. The association was primarily driven by an increase in psychological violence, which was more prevalent than sexual or physical violence. The association was stronger in countries with high gender inequality. **Conclusion:** Working from home may increase IPV risk globally. Workplaces offering working from home should collaborate with support services and research interventions to strengthen resiliency against IPV.

Miall et al. 2023.

BMC Public Health, vol. 23, no. 965.

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

Keywords: COVID-19 pandemic; domestic abuse; employment; homeworking.

Evidence Level: 4B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15785-7>

What to remove from the work environment: The sick worker or the cause of his sickness? Workplace bullying, a form of violence that causes sickness

Background: This literature review defines workplace bullying and describes the common elements, including work context, duration and frequency of bullying actions, the evolution in phases and the power differential between aggressor and victim. The paper also reviews common personality and gender issues, common professional sectors involved and the most common causes and consequence

Grima et al. 2023.

La Clinica Terapeutica, vol. 174, no. 3.

Keywords: Mobbing; physical and mental health; violence; worker; workplace bullying.

Evidence Level: 6B

Link: <https://pubmed.ncbi.nlm.nih.gov/37199368/>

Psychosocial Issues

This month we explore the relationship between workplace psychosocial resources and risk of sleep disturbances, behavioural reactions to job insecurity climate perceptions and the management of healthcare employees' job satisfaction. In Covid-19 related research we explore the relationship between Covid-19 pandemic-related life behaviour, dispositional mindfulness, and psychological health, factors impacting healthcare worker burnout during the COVID-19 pandemic and work motivation during the prolonged Covid-19 outbreak of 2021.

Workplace psychosocial resources and risk of sleep disturbances among employees

Background: Workplace psychosocial resources naturally tend to cluster in some work teams. To inform work-related sleep health promotion interventions, it is important to determine the associations between clustering of workplace resources and sleep disturbances when some resources are high while others are low and to mimic an actual intervention using observational data. To examine whether clustering of and changes in workplace psychosocial resources are associated with sleep disturbances among workers.

Design, setting, and participants: This population-based cohort study used data from the Swedish Longitudinal Occupational Survey of Health (2012-2018), the Work Environment and Health in Denmark study (2012-2018), and the Finnish Public Sector Study (2008-2014), collected biennially. Statistical analysis was conducted from November 2020 to June 2022. **Exposure:** Questionnaires were distributed measuring leadership quality and procedural justice (ie, vertical resources) as well as collaboration culture and coworker support (ie, horizontal resources). Resources were divided into clusters of general low, intermediate vertical and low horizontal, low vertical and high horizontal, intermediate vertical and high horizontal, and general high.

Main outcomes and measures: Odds ratios (ORs) and 95% CIs were reported from logistic regression models for the associations between the clustering of resources and concurrent and long-term sleep disturbances. Sleep disturbances were measured by self-administered questionnaires.

Results: The study identified 114 971 participants with 219 982 participant-observations (151 021 [69%] women; mean [SD] age, 48 [10] years). Compared with participants with general low resources, other groups showed a lower prevalence of sleep disturbances, with the lowest observed in the general high group concurrently (OR, 0.38; 95% CI, 0.37-0.40) and longitudinally after 6 years (OR, 0.52; 95% CI, 0.48-0.57). Approximately half of the participants (27 167 participants [53%]) experienced changes in resource clusters within 2 years. Improvements in vertical or horizontal dimensions were associated with reduced odds of persistent sleep disturbances, and the lowest odds of sleep disturbances was found in the group with improvements in both vertical and horizontal dimensions (OR, 0.53; 95% CI, 0.46-0.62). A

corresponding dose-response association with sleep disturbances was observed for decline in resources (eg, decline in both dimensions: OR, 1.74; 95% CI, 1.54-1.97). **Conclusions and relevance:** In this cohort study of workplace psychosocial resources and sleep disturbances, clustering of favorable resources was associated with a lower risk of sleep disturbances.

Xu et al. 2023.

JAMA Network Open, vol. 6, no. 5.

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Keywords: Sleep; sleep disturbances; employees.

Evidence Level: 4B

Link: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2804654>

Behavioral reactions to job insecurity climate perceptions: Exit, voice, loyalty, and neglect

Background: Past work has extensively documented that job insecurity predicts various work- and health-related outcomes. However, limited research has focused on the potential consequences of perceived job insecurity climate. Our objective was to investigate how the psychological climate about losing a job and valuable job features (quantitative and qualitative job insecurity climate, respectively) relate to employees' exit, voice, loyalty, and neglect behaviors, and whether such climate perceptions explain additional variance in these behaviors over individual job insecurity. **Method:** Data were collected through an online survey using a convenience sample of employees working in different organizations in Türkiye (N = 245). **Results:** Hierarchical multiple regression analyses showed that quantitative job insecurity climate was associated with higher levels of loyalty and neglect, while qualitative job insecurity climate was related to higher levels of exit and lower levels of loyalty. Importantly, job insecurity climate explained additional variance over individual job insecurity in exit and loyalty. **Conclusion:** Our findings underscore the importance of addressing job insecurity in a broader context regarding one's situation and the psychological collective climate. This study contributes to addressing the knowledge gap concerning job insecurity climate, an emerging construct in the organizational behavior literature, and its incremental impact beyond individual job insecurity. The foremost implication is that organizations need to pay attention to the evolving climate perceptions about the future of jobs in the work environment, because such perceptions are related to critical employee behaviors.

Yüce-Selvi et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 9.

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Keywords: Consequences; employee behaviors; exit; job insecurity climate; loyalty; neglect; voice.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/20/9/5732>

The management of healthcare employees' job satisfaction: optimization analyses from a series of large-scale surveys

Background: Measuring employees' satisfaction with their jobs and working environment have become increasingly common worldwide. Healthcare organizations are not extraneous to the irreversible trend of measuring employee perceptions to boost performance and improve service provision. Considering the multiplicity of aspects associated with job satisfaction, it is important to provide managers with a method for assessing which elements may carry key relevance. Our study identifies the mix of factors that are associated with an improvement of public healthcare professionals' job satisfaction related to unit, organization, and regional government. Investigating employees' satisfaction and perception about organizational climate with different governance level seems essential in light of extant evidence showing the interconnection as well as the uniqueness of each governance layer in enhancing or threatening motivation and satisfaction. **Method:** This study investigates the correlates of job satisfaction among 73,441 employees in healthcare regional governments in Italy. Across four cross sectional surveys in different healthcare systems, we use an optimization model to identify the most efficient combination of factors that is associated with an increase in employees' satisfaction at three levels, namely one's unit, organization, and regional healthcare system. **Results:** Findings show that environmental characteristics, organizational management practices, and team coordination mechanisms correlates with professionals' satisfaction. Optimization analyses reveal that improving the planning of activities and tasks in the unit, a sense of being part of a team, and supervisor's managerial competences correlate with a higher satisfaction to work for one's unit. Improving how managers do their job tend to be associated with more satisfaction to work for the organization. **Conclusion:** The study unveils commonalities and differences of personnel

administration and management across public healthcare systems and provides insights on the role that several layers of governance have in depicting human resource management strategies.

Cantarelli et al. 2023.

BMC Health Services Research, vol. 23, no. 428.

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Keywords: Healthcare employees; healthcare governance; job satisfaction; large-scale viewpoint surveys; optimization analysis.

Evidence Level: 4B

Link: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-023-09426-3>

Relationship between COVID-19 pandemic-related life behavior, dispositional mindfulness, and psychological health: Evidence from a sample of Japanese working adults

Background: The present study investigated how altered daily life behavior and its self-evaluation associated with the coronavirus disease 2019 (COVID-19) pandemic relate to psychological health in Japanese working adults, and how such relationships may be moderated by dispositional mindfulness.

Method: A total of 1000 participants completed an online survey comprising questions on how they used time and self-evaluated life behavior before and during the pandemic, as well as scales on mindfulness and psychological health. **Results:** The results revealed that after the pandemic, participants spent significantly more time at home and using a PC/smartphone. They were also more likely to perceive frequent exposure to COVID-19-related media reports and less likely to find their work going well. Many of these variables were significantly correlated with lower psychological health. Moreover, hierarchical multiple regression analyses revealed the moderating effects of mindfulness, such that the perceived frequency of exposure to pandemic-related media reports and poorer views that work was going well were less likely to predict lower psychological health when mindfulness was high. **Conclusion:** These findings suggest that altered daily life behavior and its self-evaluation after the pandemic are associated with deteriorated psychological health, but that mindfulness can serve as a protective factor against psychological distress among Japanese workers.

Miyata et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: COVID-19 pandemic; Japanese workers; altered lifestyle; dispositional mindfulness; moderation; psychological health.

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/20/10/5873>

A longitudinal cohort study of factors impacting healthcare worker burnout in New York City during the COVID-19 pandemic

Background: This study aimed to longitudinally examine the prevalence and correlates of burnout in frontline healthcare workers (FHCWs) during COVID-19 in New York City. **Method:** A prospective cohort study of 786 FHCWs at Mount Sinai Hospital was conducted during the initial COVID surge in April to May 2020 (T1) and November 2020 to January 2021 (T2) to assess factors impacting burnout. **Results:** Burnout increased from 38.9% to 44.8% ($P = 0.002$); 222 FHCWs (28.3%) had persistent burnout, 82 (10.5%) had early burnout, and 129 (16.5%) had delayed burnout. Relative to FHCWs with no burnout ($n = 350$; 44.7%), those with persistent burnout reported more prepandemic burnout (relative risk [RR], 6.67), less value by supervisors (RR, 1.79), and lower optimism (RR, 0.82), whereas FHCWs with delayed burnout reported more prepandemic burnout (RR, 1.75) and caring for patients who died (RR, 3.12). **Conclusion:** FHCW burnout may be mitigated through increasing their sense of value, support, and optimism; treating mental health symptoms; and counseling regarding workplace distress.

Peccoralo et al. 2023.

Journal of Occupational and Environmental Medicine, vol. 65, no. 5.

User License: *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)* (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords: Healthcare worker; burnout; New York City; COVID-19; pandemic.

Evidence Level: 4B

Link:

https://journals.lww.com/joem/Fulltext/2023/05000/A_Longitudinal_Cohort_Study_of_Factors_Impacting_2.aspx

A reverse pattern in work motivation among Vietnamese health care workers during the prolonged COVID-19 outbreak of 2021: Determinants and implications

Background: The workload burden of the COVID-19 pandemic on health systems requires not only financial support but also long-term and contextualized policies. We assessed the work motivation and its determinants among health workers at Vietnamese hospitals and facilities during the prolonged COVID-19 outbreaks in 2021. **Method:** A cross-sectional study was conducted among 2814 health care professionals across all three regions of Vietnam from October to November 2021. An online questionnaire, including the Work Motivation Scale, distributed by the snowball method to a subgroup of 939 respondents, investigated changes in working characteristics due to COVID-19, work motivation, and occupational intention.

Results: Only 37.2% of respondents committed to their current job and about 40% reported a decrease in their job satisfaction. The Work Motivation Scale scored the lowest in "financial motivation" and the highest in "perception of work value". Participants who were in the north region, of younger age, unmarried, and who had a low level of adaptability to external work pressure, shorter experience, and less job satisfaction tended to be less motivated and committed to their current job. **Conclusion:** Intrinsic motivation has increased in importance during the pandemic. Therefore, policymakers should develop interventions that raise intrinsic, psychological motivation instead of only focusing on salary raises. Issues about intrinsic motivations of health care workers such as low adaptability to stress and professionalism in routine work should be prioritized during the pandemic preparedness and control.

Doan et al. 2023.

Journal of Global Health, vol. 13.

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Keywords: Healthcare workers; work motivation; COVID-19; pandemic; workload burden.

Evidence Level: 4B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10214768/>

Fostering Work Participation

Presenteeism and Absenteeism

This month we explore the relationships between psychosocial working conditions and sickness absence, and latent classes of unhealthy behaviours and subsequent sickness absence

Psychosocial working conditions and sickness absence among younger employees in Denmark: A register-based cohort study using job exposure matrices

Background: Previous literature has established associations between psychosocial working conditions and sickness absence (SA), but only few studies have examined associations among younger employees. This study aimed to investigate associations between psychosocial working conditions and SA among employees, aged 15-30 years, who entered the labor market in Denmark between 2010 and 2018.

Method: We followed 301 185 younger employees in registers for on average 2.6 years. Using job exposure matrices, we assessed job insecurity, quantitative demands, decision authority, job strain, emotional demands, and work-related physical violence. Adjusted rate ratios of SA spells of any length were estimated for women and men separately with Poisson models. **Results:** Among women, employment in occupations with high quantitative demands, low decision authority, high job strain, high emotional demands, or high work-related physical violence was associated with higher rates of SA. Being employed in occupations with high versus low emotional demands showed the strongest association with SA, with a rate ratio of 1.44 [95% confidence interval (CI) 1.41-1.47]. Among men, being employed in occupations with low decision authority showed the strongest association with SA (1.34, 95% CI 1.31-1.37), whereas occupations

with high quantitative demands, high job strain, and high emotional demands were associated with lower rates of SA. **Conclusion:** We found that several psychosocial working conditions were associated with SA spells of any length. Associations with SA spells of any length resemble associations with long-term SA, suggesting that results from previous studies on long-term SA may be generalizable to all lengths of SA among younger employees.

Sørensen et al. 2023.

Scandinavian Journal of Work, Environment and Health, vol. 49, no. 4.

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Keywords: Sickness absence; psychosocial working conditions; younger employees; job exposure.

Evidence Level: 4B

Link: <https://www.sjweh.fi/article/4083>

Latent classes of unhealthy behaviours and their associations with subsequent sickness absence: A prospective register-linkage study among Finnish young and early midlife employees

Background: Unhealthy behaviours are associated with increased sickness absence (SA), but few studies have considered person-oriented approach in these associations. Using latent class analysis, we examined clustering of unhealthy behaviours among Finnish municipal employees and their associations with subsequent SA. **Design:** A prospective register-linkage study. **Setting:** Unhealthy behaviours (low leisure-time physical activity, non-daily fruit and vegetable consumption, insufficient sleep, excessive alcohol use and tobacco use) were derived from the Helsinki Health Study questionnaire survey, collected in 2017 among 19- to 39-year-old employees of the City of Helsinki, Finland. **Participants:** A total of 4002 employees (81% women) of the City of Helsinki, Finland. **Primary outcome measures:** The questionnaire data were prospectively linked to employer's SA register through March 2020. Associations between latent classes of unhealthy behaviours and subsequent SA (1-7 days/8+ days/all lengths) were examined using negative binomial regression. **Results:** Among women, a three-class latent class model was selected: (1) few unhealthy behaviours (84%), (2) excessive alcohol and tobacco use (12%) and (3) several unhealthy behaviours (5%). Women belonging to classes 2 and 3 had increased SA rates compared with those in class 1, regardless of the length of SA spells. Among men, a 2-latent class model was selected: (1) few unhealthy behaviours (53%) and (2) several unhealthy behaviours (47%). Men belonging to class 2 had increased rates of 1-7 days' SA compared with men in class 1. **Conclusion:** This study suggests that preventive actions aiming to reduce employees' SA should consider simultaneously several unhealthy behaviours. Targeted interventions may benefit of identifying the clustering of these behaviours among occupational groups.

Salmela et al. 2023.

BMJ Open, vol. 13, no. 5.

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Keywords: Epidemiologic studies; occupational & industrial medicine; preventive medicine; public health.

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/13/5/e070883.long>

Workers' compensation

Frequency and cost of claims by injury type from the Korea workers' compensation insurance between 2016 and 2019

Background: This study aimed to examine the frequency of worker injuries by affected body part(s) and the associated costs. **Method:** We performed a secondary analysis of national workers' compensation claims data from the Korean workers' compensation insurance. The main outcome measures were frequency and cost of claims by injury type. **Results:** Multiple injuries were ranked as the highest injury type in the number of annual claims and percentage of the total cost/total medical cost. Hand/wrist/finger was the most common single-injury type. The frequency of injury type and the cost amount payable as a percentage of the total cost were the highest for multiple injuries, hand/wrist/finger injuries, and knee/lower leg injuries. **Conclusion:** Regarding frequency and costs, hand/wrist/finger injuries were highest in cost, by single-injury type. Therefore, these injuries should be recognized as intervention targets.

Bae et al. 2023.

Journal of Occupational and Environmental Medicine, vol. 65, no. 5.

User License: *Creative Commons Attribution -NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)* (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords: Workers' Compensation; worker injuries; Korea.

Evidence Level: 4B

Link:

https://journals.lww.com/joem/Fulltext/2023/05000/Frequency_and_Cost_of_Claims_by_Injury_Type_From.18.aspx

Working Hours

Trajectories of marginal part-time work and risk of depression. Does job or income insecurity mediate the relation?

Background: Working few hours a week, known as marginal part-time work, may increase both job and income insecurity, which have been linked to the risk of depression. This study examines the association between marginal part-time work and depression and the mediating role of job and income insecurity. **Method:** We included 30 523 respondents of the Danish Labor Force Survey (DLFS) between 2010 and 2017 and linked them to register-based information on weekly working hours, which was used to identify full-time workers and model group-based trajectories of marginal part-time. These data were linked with survey information on job and income insecurity, and register-based information on hospital-diagnosed depression or redeemed anti-depressant drugs in the following two years. We estimated hazard ratios (HR) by Cox proportional hazards models and conducted mediation analyses to estimate the natural direct and indirect effects using job and income insecurity as mediators. **Results:** We identified three distinct trajectories of marginal part-time work: constant marginal part-time work, mobile towards marginal part-time work, and fluctuating in and out of marginal part-time work. Compared with full-time workers, the constant [HR 2.42, 95% confidence interval (CI) 1.83-3.20], mobile (HR 2.84, 95% CI 2.16-3.75), and fluctuating (HR 3.51, 95% CI 2.07-5.97) trajectories all had higher risks of depression. There was no evidence of mediation by either job (HR 1.02, 95% CI 0.92-1.12) or income (HR 0.98, 95% CI 0.89-1.08) insecurity. **Conclusion:** We found a higher risk of depression following marginal part-time work. The higher risk was not mediated by job or income insecurity.

Nielsen et al. 2023.

Scandinavian Journal of Work, Environment and Health, vol. 49, no. 4.

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Keywords: Part-time work; depression; job security; income security.

Evidence Level: 4B

Link: <https://www.sjweh.fi/article/4091>

Wellness Programs

Effectiveness of worksite wellness programs based on physical activity to improve workers' health and productivity: A systematic review

Background: Although the scientific literature has previously described the impact of worksite programs based on physical activity (WPPAs) on employees' productivity and health in different contexts, the effect of these programs has not been analyzed based on the characteristics or modalities of physical activity (PA) performed (e.g., aerobic exercise, strength training, flexibility). In addition, studies on WPPAs usually report health and productivity outcomes separately, not integrated into a single study. Knowing the health and economic-related impacts of a WPPAs could provide useful information for stakeholders and policy development. **Objective:** The purpose of this review was as follows: (1) to analyze the effect of different modalities of WPPAs on employees' productivity and health and (2) to investigate the economic impact of WPPAs. **Method:** This systematic review is registered in PROSPERO (CRD42021230626) and complies with PRISMA guidelines. Only randomized controlled trials from 1997 to March 2021 were included. Two

reviewers independently screened abstracts and full texts for study eligibility, extracted the data, and performed a quality assessment using the Cochrane Collaboration Risk-of-Bias Tool for randomized trials. Population, instruments, comparison, and outcome (PICO) elements were used to define eligibility criteria. Eight-hundred sixty relevant studies were found through electronic searches in PubMed, Web of Science, Medline, Scopus, and SPORTDiscus databases. Once the eligibility criteria were applied, a total of 16 papers were included. **Results:** Workability was the productivity variable most positively impacted by WPPAs. Cardiorespiratory fitness, muscle strength, and musculoskeletal symptoms health variables improved in all the studies included. It was not possible to fully examine the effectiveness of each exercise modality because of the heterogeneity in methodology, duration, and working population. Finally, cost-effectiveness could not be analyzed because this information was not reported in most studies. **Conclusion:** All types of WPPAs analyzed improved workers' productivity and health. However, the heterogeneity of WPPAs does not allow to identify which modality is more effective.

Marin-Farrona et al. 2023.

Systematic Reviews, vol. 12, no. 87.

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Keywords: Cardiorespiratory; company; employee; exercise; occupational health and safety; work-ability.

Evidence Level: 1A

Link: <https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-023-02258-6>

Shift Work

This month we explore the associations between rotating night shift work, and Type 2 Diabetes, nightshift work and oxidative DNA damage and gene-x-environment analysis of eveningness chronotype on sleep duration among those who always work night shift.

Association of rotating night shift work, CLOCK, MTNR1A, MTNR1B genes polymorphisms and their interactions with Type 2 Diabetes among steelworkers: A case-control study

Background: The purpose of this study is to investigate the association of rotating night shift work, CLOCK, MTNR1A, MTNR1B genes polymorphisms and their interactions with type 2 diabetes among steelworkers.

Method: A case-control study was conducted in the Tangsteel company in Tangshan, China. The sample sizes of the case group and control group were 251 and 451, respectively. The logistic regression, log-linear model and generalized multifactor dimensionality (GMDR) method were used to investigate the interaction between circadian clock gene, melatonin receptor genes and rotating night shift work on type 2 diabetes among steelworkers. Relative excess risk due to interaction (RERI) and attributable proportions (AP) were used to evaluate additive interactions. **Results:** Rotating night shift work, current shift status, duration of night shifts, and average frequency of night shifts were associated with an increased risk of type 2 diabetes after adjustment for confounders. Rs1387153 variants in MTNR1B was found to be associated with an increased risk of type 2 diabetes, which was not found between MTNR1A gene rs2119882 locus, CLOCK gene rs1801260 locus and the risk of type 2 diabetes. The association between rotating night shift work and risk of type 2 diabetes appeared to be modified by MTNR1B gene rs1387153 locus (RERI = 0.98, (95% CI, 0.40-1.55); AP = 0.60, (95% CI, 0.07-1.12)). The interaction between MTNR1A gene rs2119882 locus and CLOCK gene rs1801260 locus was associated with the risk of type 2 diabetes (RERI = 1.07, (95% CI, 0.23-1.91); AP = 0.77, (95% CI, 0.36-1.17)). The complex interaction of the MTNR1A-MTNR1B-CLOCK-rotating night shift work model based on the GMDR methods may increase the risk of type 2 diabetes (P = 0.011).

Conclusion: Rotating night shift work and rs1387153 variants in MTNR1B were associated with an increased risk of type 2 diabetes among steelworkers. The complex interaction of MTNR1A-MTNR1B-CLOCK-rotating night shift work may increase the risk of type 2 diabetes.

Li et al. 2023.

BMC Genomics, vol. 24, no. 1.

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Keywords: Circadian rhythm; interaction; melatonin receptors; polymorphisms; rotating night shift work.

Evidence Level: 5B

Link: <https://bmccgenomics.biomedcentral.com/articles/10.1186/s12864-023-09328-y>

Nightshift work can induce oxidative DNA damage: A pilot study

Background: Regular sleep is very important for human health; however, the short-term and long-term effects of nightshift with sleep deprivation and disturbance on human metabolism, such as oxidative stress, have not been effectively evaluated based on a realistic cohort. We conducted the first long-term follow-up cohort study to evaluate the effect of nightshift work on DNA damage. **Method:** We recruited 16 healthy volunteers (aged 33 ± 5 years) working night shifts at the Department of Laboratory Medicine at a local hospital. Their matched serum and urine samples were collected at four time points: before, during (twice), and after the nightshift period. The levels of 8-oxo-7,8-dihydroguanosine (8-oxoG) and 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodG), two important nucleic-acid damage markers, were accurately determined based on a robust self-established LC-MS/MS method. The Mann-Whitney U or Kruskal-Wallis test was used for comparisons, and Pearson's or Spearman's correlation analysis was used to calculate the correlation coefficients. **Results:** The levels of serum 8-oxodG, estimated glomerular filtration rate-corrected serum 8-oxodG, and the serum-to-urine 8-oxodG ratio significantly increased during the nightshift period. These levels were significantly higher than pre-nightshift work level even after 1 month of discontinuation, but no such significant change was found for 8-oxoG. Moreover, 8-oxoG and 8-oxodG levels were significantly positively associated with many routine biomarkers, such as total bilirubin and urea levels, and significantly negatively associated with serum lipids, such as total cholesterol levels. **Conclusion:** The results of our cohort study suggested that working night shifts may increase oxidative DNA damage even after a month of discontinuing nightshift work. Further studies with large-scale cohorts, different nightshift modes, and longer follow-up times are needed to clarify the short- and long-term effects of night shifts on DNA damage and find effective solutions to combat the negative effects.

Zou et al. 2023.

BMC Public Health, vol. 23, no. 1.

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Keywords: 8-oxo-7,8-dihydro-2'-deoxyguanosine; 8-oxo-7,8-dihydroguanosine; night shift; nucleic-acid damage.

Evidence Level: 5A

Link: <https://bmccpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15742-4>

The association between night shift work and breast cancer risk in the Finnish twins cohort

Background: Breast cancer is highly prevalent yet a more complete understanding of the interplay between genes and probable environmental risk factors, such as night work, remains lagging. **Method:** Using a discordant twin pair design, we examined the association between night shift work and breast cancer risk, controlling for familial confounding. Shift work pattern was prospectively assessed by mailed questionnaires among 5,781 female twins from the Older Finnish Twin Cohort. Over the study period (1990-2018), 407 incident breast cancer cases were recorded using the Finnish Cancer Registry. Cox proportional hazards models were used to calculate hazard ratios (HRs) and 95% confidence intervals (CIs) adjusting for potential confounders. Within-pair co-twin analyses were employed in 57 pairs to account for potential familial confounding. **Results:** Compared to women who worked days only, women with shift work that included night shifts had a 1.58-fold higher risk of breast cancer (HR = 1.58; 95%CI, 1.16-2.15, highest among the youngest women i.e. born 1950-1957, HR = 2.08; 95%CI, 1.32-3.28), whereas 2-shift workers not including night shifts, did not (HR = 0.84; 95%CI, 0.59-1.21). Women with longer sleep (average sleep duration > 8 h/night) appeared at greatest risk of breast cancer if they worked night shifts (HR = 2.91; 95%CI, 1.55-5.46; Pintx=0.32). Results did not vary by chronotype (Pintx=0.74). Co-twin analyses, though with limited power, suggested that night work may be associated with breast cancer risk independent of early environmental and genetic factors. **Conclusion:** These results confirm a previously described association between night shift work and breast cancer risk. Genetic influences only partially explain these associations.

Schernhammer et al. 2023.

European Journal of Epidemiology, vol. 38.

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Keywords: Breast cancer; night work; shift work; twins.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007/s10654-023-00983-9>

Gene-x-environment analysis supports protective effects of eveningness chronotype on self-reported and actigraphy-derived sleep duration among those who always work night shifts in the UK Biobank

Background: Previous research has linked having an eveningness chronotype with a higher tolerance for night shift work, suggesting the ability to work nights without health consequences may partially depend upon having a circadian clock optimized for these times. As chronotypes entrain over time to environmental cues, it remains unclear whether higher relative eveningness among healthy night workers reflects a moderating or mediating effect of chronotype on health. **Method:** We address these concerns conducting a genome-wide association study and utilizing a polygenic score (PGS) for eveningness as a time-invariant measure of chronotype. On a sample of 53 211 workers in the UK Biobank (2006-2018), we focus on the effects of night shift work on sleep duration, a channel through which night shift work adversely affects health. We ask whether a higher predisposition toward eveningness promotes night shift work tolerance. **Results:** Results indicate that regular night shift work is associated with a 13-minute (3.5%) reduction in self-reported sleep per night relative to those who never work these hours (95% confidence interval [CI] = -17:01, -8:36). We find that eveningness has a strong protective effect on night workers: a one-SD increase in the PGS is associated with a 4-minute (28%) reduction in the night shift work sleep penalty per night (CI = 0:10, 7:04). This protective effect is pronounced for those working the longest hours. **Conclusion:** Consistent patterns are observed with an actigraphy-derived measure of sleep duration. These findings indicate that solutions to health consequences of night shift work should take individual differences in chronotype into account.

Akimova et al. 2023.

Sleep, vol. 46, no. 5.

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Keywords: GWAS; eveningness chronotype; gene-environment interaction; night shift work; sleep duration.

Evidence Level: 4B

Link: <https://academic.oup.com/sleep/article/46/5/zsad023/7028737?login=true>

Work Ability

This month we explore the impact of physical fitness, social life, and cognitive functions on work ability in middle-aged and older adults, and physical activity after revision knee arthroplasty including return to sport and work. In Covid-19 related research we explore work health in workers and job seekers with work disabilities:

The impact of physical fitness, social life, and cognitive functions on work ability in middle-aged and older adults

Background: Demographic changes encompass societies to maintain the work ability (WA) of aging workforces. The present study explored the relationship between modifiable lifestyle factors, cognitive functions, and their influence on WA, using a multi-group structural equation approach. **Method:** Cross-sectional data from 247 middle-aged and 236 older employees from the Dortmund Vital Study were included in this analysis. We proposed a model with three exogenous variables (Physical Fitness, Cognitive Functions, and Social Life), and with WA as the endogenous variable. WA was measured with the Work Ability Index (WAI), which considers job demands and individual physical and mental resources. Multi-group analyses were based on the principles of invariance testing and conducted using robust estimation methods. **Results:** Results revealed that Social Life outside work had significant positive effects on WA in both, middle-aged and older adults. Physical Fitness had a significant effect on WA only in middle-aged adult, and Cognitive Functions had no significant influence on WA in either group. In older adults, Physical Fitness correlated with Cognitive Functions, whereas in middle-aged adults, Cognitive Functions marginally correlated with Social Life. **Conclusion:** Our results underline the importance of an active social life outside

the workplace for WA, regardless of the employees' age. The influence of Physical Fitness on WA changes with increasing age, indicating the necessity to have a differentiated view of age effects and interacting influencing factors. Our research contributes to the knowledge of how WA could be most effectively promoted in different age groups.

Rieker et al. 2023.

International Archives of Occupational and Environmental Health, vol. 96, no. 4.

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Keywords: Aging; Lifestyle factors, cognition, structural equation model (SEM); occupational health; work ability index.

Evidence Level: 4B

Link: <https://link.springer.com/article/10.1007/s00420-022-01943-8>

Physical activity after revision knee arthroplasty including return to sport and work: A systematic review and meta-analysis including GRADE

Background: The number of primary knee arthroplasties (KAs) performed annually is rising, especially among active, working age patients. Consequently, revision KA is also increasingly performed. Our aim was to systematically review the extent to which patients were physically active following revision KA, and the rate and timing of return to sport and work. **Method:** A search was conducted in the databases Medline and Embase until February 24th, 2023. Studies describing patients with revision total knee arthroplasty (rTKA) or revision unicompartmental knee arthroplasty (rUKA), with outcomes regarding physical activity or return to sport (RTS) or work (RTW) were included. Quality of studies was assessed using the Newcastle-Ottawa scale, meta-analyses were performed using RevMan 5.4 and Grading of Recommendations, Assessment, Development, and Evaluations (GRADE). **Results:** Of the 4,314 articles screened, 22 studies were included describing 2,462 rTKA patients (no rUKA), 42% were male with a mean age of 67 years (range 24 - 95). No studies reported objective physical activity measurements. Twenty-two studies reported patient reported outcome measures (PROMs). The PROMs that were pooled on a scale from zero to ten were the UCLA Activity Score, the Tegner Activity Level Scale, the Lower-Extremity Activity Scale, Devane Activity Score, and physical activity related subscales of the Knee injury and Osteoarthritis Outcome Score. The retrospective studies of moderate quality showed a statistically significant postoperative improvement of 1.7 points (MD = 1.71, 95% CI 1.48 - 1.94 ($p < 0.0001$); 14 studies, $n = 1,211$). For the prospective moderate-quality studies, a statistically significant postoperative increase of 0.9 points was found (MD = 0.89, 95% CI 0.48 - 1.30 ($p < 0.0001$); 6 studies, $n = 1,027$). Regarding RTS, 12% of patients participated in so-called 'non-recommended' activities (i.e., hockey, soccer, football, gymnastics, jogging, singles tennis, and basketball) after rTKA (1 study, $n = 206$). The pooled RTW was 86% (2 studies, range 18-95%, $n = 234$). **Conclusion:** The majority of patients self-reported an improved postoperative activity level after rTKA. Patients could maintain an active lifestyle in daily life, including sports and work. For reliable physical activity, RTS and RTW estimations, more studies are required. In terms of GRADE, the quality of evidence for the five prospective studies was rated as low.

van der Wilk et al. 2023.

BMC Musculoskeletal Disorders, vol. 24, no. 1.

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Keywords: Knee arthroplasty; knee replacement; osteoarthritis; physical activity; prognosis; recovery of function; return to sport; return to work; revision.

Evidence Level: 1A

Link: <https://bmcmusculoskeletaldisord.biomedcentral.com/articles/10.1186/s12891-023-06458-y>

Work and health during the COVID-19 crisis among Dutch workers and jobseekers with (partial) work disabilities: A mixed methods study

Background: The consequences of restrictive measures during the COVID-19 outbreak have potentially been enormous, especially for those in a vulnerable position in the labour market. This study aims to describe the impact of the COVID-19 crisis on work status, working conditions and health among people with (partial) work disabilities-with and in search of work-during the COVID-19 pandemic in the Netherlands. **Method:** A mixed methods design was used, combining a cross-sectional online survey and

ten semi-structured interviews with people with a (partial) work disability. The quantitative data included responses to job-related questions, self-reported health, and demographics. The qualitative data consisted of participants' perceptions about work, vocational rehabilitation, and health. We used descriptive statistics to summarize the responses, conducted logistic and linear regression and integrated our qualitative findings with the quantitative findings, aiming at complementarity. **Results:** Five hundred and eighty-four participants (response rate 30.2%) completed the online survey. The majority of participants experienced no change in work status: 39 percent remained employed, 45 percent remained unemployed, six percent of respondents lost their job, and ten percent became employed during the COVID-19 crisis. In general, the results showed a deterioration in self-rated health during the COVID-19 outbreak, both for participants at work and in search of work. Participants who lost their job during the COVID-19 crisis reported the highest deterioration in self-rated health. Interview findings revealed that loneliness and social isolation were persistent during the COVID-19 crisis, especially among those in search of work. Additionally, employed participants identified a safe work environment and the possibility to work at the office as important factors for overall health. **Conclusion:** The vast majority of study participants (84.2%) experienced no change in work status during the COVID-19 crisis. Nonetheless, people at work and in search of work encountered barriers to maintaining or (re)gaining employment. People with a (partial) work disability who lost their job during the crisis appeared to be most affected in terms of health. Employment and health protections could be strengthened for persons with (partial) work disabilities in order to build resilience in times of crisis.

de Visser et al. 2023.

BMC Public Health, vol. 23, no. 1.

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Keywords: COVID-19; disability; employment; perceived health; working conditions.

Evidence Level: 5B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15720-w>

Job Design

This month we explore factors affecting remote workers' job satisfaction, the relationship between informal learning and self-regulated learning in the workplace and the comparison of work efficiency pre & post covid lockdown

Factors affecting remote workers' job satisfaction in Utah: An exploratory study

Background: With structural changes in work arrangements, employee retention becomes more important for organizational success. Guided by the Ability, Motivation, Opportunity (AMO) framework, this study investigated the factors affecting remote workers' job satisfaction and personal wellbeing in Utah.

Method: From a sample of n = 143 remote workers, the study used a correlational design to identify the significant predictors of job satisfaction and personal wellbeing. It mapped the relationships between significant predictors of job satisfaction and personal wellbeing and explored the role of human resources (HR) policies and organizational culture in a remote work environment. **Results:** Results showed intrinsic motivation, affective commitment, opportunity, and amotivation affected employee job satisfaction, while self-efficacy, amotivation, and job satisfaction affected personal wellbeing. A structural equation model (SEM) showed that remote workers with higher levels of self-efficacy, lower amotivation, and higher job satisfaction were likely to have greater personal wellbeing compared to others. When exploring the role of HR, findings showed that HR bundles and organizational culture indirectly affected job satisfaction but had a direct effect on the most important predictors of job satisfaction and personal wellbeing.

Conclusion: Overall, results demonstrated the interconnectivity of HR practices, AMO factors, job satisfaction, and personal wellbeing.

Ali et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 9.

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Keywords: AMO framework; Utah; employee wellbeing; human resources bundles; job performance; job satisfaction; organizational culture; remote worker.

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/20/9/5736>

It's all metacognitive: The relationship between informal learning and self-regulated learning in the workplace

Background: Informal workplace learning accounts for a large extent of employees' learning. Informal learning activities such as reflection or keeping up-to-date resemble self-regulated learning strategies that indicate the ability to plan, monitor, and regulate one's learning. However, little is known about the relationship between informal learning behaviors and self-regulated learning strategies. **Methods and Results:** Structural equation modeling with data from 248 employees revealed that the informal learning behaviors of reflection, keeping up-to-date, feedback-seeking, and knowledge-sharing are strongly related to the metacognitive self-regulated learning strategies of monitoring and regulation. However, informal learning behaviors lack the deep-processing strategies of elaboration and organization, and the resource strategies of help-seeking and effort regulation. Only innovative behavior is strongly related to effort regulation. These results suggest a potential deficit in employees' strategy use. **Conclusion:** Employees should consider further resources to increase their learning effectiveness in the workplace. The results are discussed, and practical implications are outlined.

Kittel et al. 2023.

PLoS One, vol. 18, no. 5.

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Keywords: Workplace; informal learning; learning; self-regulated strategies.

Evidence Level: 5B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0286065>

Comparison of work efficiency in factory workers: Pre & post covid lockdown - A cross sectional study

Background: The COVID-19 pandemic's impact on economies worldwide has caused changes in work patterns, reduced productivity, and job losses, particularly affecting factory workers. Lockdown measures have also led to reduced physical activity levels, which is a significant risk factor for chronic diseases. This study aims to investigate efficiency of factory workers pre and post lockdown periods. The findings will contribute to identifying evidence-based strategies to minimize the negative impact of lockdown measures on factory workers' productivity and health. **Materials and Method:** A cross-sectional study was conducted to assess the work performance of employees in a medicine manufacturing unit. Data was collected from factory workers online and study period was January 2021 to April 2022. Survey includes close ended questions regarding work performance of employees before lockdown period (Before 20/03/2020) and performance after lockdown period (After August 2020). The sample size of 196 employees selected through simple random sampling. A questionnaire consisting of demographic factors, work details, and work performance was prepared using pretested standard tools, including the Individual Work Performance Questionnaire (IWPQ), the World Health Organization Health and Work Performance Questionnaire (HPQ), and the Stanford Presenteeism Scale (SPS-6). The collected data was analysed using descriptive statistics and a paired t-test. **Results:** The study found that prior to lockdown, 99% of employees consistently had higher performance, with 71.4% ranking in the top 10. However, after lockdown, the percentage of employees with high performance decreased to 91.8%, with only 63.3% ranking in the top 10. These differences were statistically significant, indicating a decrease in work efficiency of 8.1%. Before lockdown, employees worked longer hours, including on off days, while after lockdown, a small proportion missed work due to various reasons, resulting in better quality work. **Conclusion:** In conclusion, the study highlights the significant impact of the COVID-19 pandemic on the work efficiency of factory workers. The findings indicate a decrease in work efficiency after the lockdown, coupled with an increase in employee stress. This suggests that the pandemic has brought about unique challenges for factory workers that need to be addressed to maintain their well-being and productivity. This study emphasizes the importance of creating a supportive work environment that prioritizes the mental and physical health of employees, especially during times of crisis.

Kotagi et al. 2023.

BMC Public Health, vol. 23, no. 1.

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Keywords: COVID lockdown; employee performance; factory workers; industrial sector; pandemic impact; post-lockdown; pre-lockdown; work efficiency; workplace interventions.

Evidence Level: 4A

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15886-3>

Adapting to the Future of Work

Aging Workforce

This month we explore the effect of the Silver Human Resources Center on pre-frailty among older people, and the effect of aging on metabolic capacity and work efficiency.

The improvement effect of working through the Silver Human Resources Center on pre-frailty among older people: A two-year follow-up study

Background: Although the health benefits of working in old age are well known, no research has examined them among older people with pre-frailty. We examined the improvement effect of working through the Silver Human Resources Center (SHRC) on pre-frailty among older people in Japan. **Method:** We carried out a two-year longitudinal survey from 2017 to 2019. Among 5,199 older people, the analysis included 531 participants who were judged to be of pre-frailty status at baseline and who completed both surveys. We utilized the records of participants' work through the SHRC from 2017 to 2019. The evaluation of the frequency of working through the SHRC was categorized as "less-working" (i.e., less than a few times a month), "moderate-working" (i.e., one to two times a week), and "frequent-working" (i.e., more than three times a week). The transition of frailty status was classified as "improved" (from pre-frailty to robust) and "non-improved" (from pre-frailty to pre-frailty or frailty). Logistic regression was used to assess the influence of the frequency of working through the SHRC on the improvement of pre-frailty. The analysis model was adjusted for age, sex, working for financial reward, years of membership, community activities, and health status at baseline. Inverse-probability weighting was used to correct for survival bias in the follow-up period. **Results:** The improvement rate of pre-frailty during follow-up was 28.9% among the less-working, 40.2% in the moderate-working, and 36.9% in the frequent-working groups. The improvement rate in the less-working group was significantly lower than that in the other two groups ($\phi = -2.4$). Multivariable logistic regression analysis showed that individuals in the moderate-working group had significantly higher odds of pre-frailty improvement than those in the less-working group (OR: 1.47, 95% CI: 1.14-1.90), and no significant differences were found between the frequent-working and less-working groups. **Conclusion:** We found that the participants engaged in moderate working through the SHRC significantly increased their rate of pre-frailty improvement, while frequent working showed no significant association. Therefore, in the future it is important to provide moderate work to older people with pre-frailty according to their health status.

Morishita-Suzuki et al. 2023.

BMC Geriatrics, vol. 23, no. 1.

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Keywords: Frailty; pre-frailty; silver human resources center; working in old age.

Evidence Level: 4B

Link: <https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-023-03978-z>

Aging increases metabolic capacity and reduces work efficiency during handgrip exercise in males

Background: Maximal oxygen uptake and exercise performance typically decline with age. However, there are indications of preserved vascular function and blood flow regulation during arm exercise. Yet, it is unknown if this potential physiological preservation with age is mirrored in peripheral metabolic capacity and $\dot{V}O_2/W$ ratio. **Method:** Thus, to investigate the effects of aging in the arms, we measured metabolic

and vascular responses to 6-min bouts of dynamic handgrip exercise at 40% and 80% of maximal work rate (WR_{max}) in 11 young (26 ± 2 yr) and 12 old (80 ± 6 yr) males, applying Doppler-ultrasound combined with blood samples from a deep forearm vein. **Results:** At baseline, the old had a larger arterial diameter compared with young (P < 0.001). During exercise, the two groups reached the same WR_{max}. $\dot{V}O_2$, blood flow, and oxygen supply were higher (40%WR_{max}; 80%WR_{max}, all P < 0.01), and arteriovenous oxygen difference was lower (80%WR_{max}, P < 0.02), in old compared with young. Old also had a higher oxygen excess at 80%WR_{max} (P < 0.01) than young, whereas no difference in muscle diffusion or oxygen extraction was detected. Only young exhibited an increase in intensity-induced arterial dilation (P < 0.05), and they had a lower mean arterial pressure than old at 80%WR_{max} (P < 0.001). $\dot{V}O_2/W$ (40%WR_{max}; 80%WR_{max}) was reduced in old compared with young (both P < 0.05). **Conclusion:** In conclusion, in old and young males with a similar handgrip WR_{max}, old had a higher $\dot{V}O_2$ during 80%WR_{max} intensity, achieved by an increased blood flow. This may be a result of the available cardiac output reserve, compensating for reduced work efficiency and attenuated vascular response observed in old. **NEW & NOTEWORTHY** Contrasting the typically observed decline in $\dot{V}O_{2max}$ with age, the current study **reveals** an age-related increase in forearm metabolic capacity during handgrip exercise in old, mediated by an increased forearm blood flow. Exercise with a small muscle mass in arms, where central components of the oxygen transport are not limiting, allows old to attain a similar maximal work rate as young despite their increased $\dot{V}O_2/W$ ratio.

Pedrinolla et al. 2023.

Journal of Applied Physiology, vol. 134, no. 5.

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Keywords: $\dot{V}O_{2max}$; $\dot{V}O_{2peak}$; exercise; forearm; muscle diffusion; vascular conductance; vascular function.

Evidence Level: 5A

Link: <https://journals.physiology.org/doi/prev/20230323-aop/abs/10.1152/jappphysiol.00411.2022>

Technology

This month we explore the use of virtual reality in restorative environments, trends in robotics research in occupational safety and health, the effect of a digital intervention for working adults with short sleep and autistic employees' technology-based workplace accommodation preferences

Using virtual reality to bring restorative environments to employees: An online pilot study

Background: Employees face many demands throughout the workday. Participating in activities can help employees recover from the pressures of work, and physical activity and time spent in nature are among the most beneficial. Simulations of nature offer some of the benefits of actual contact with nature and can address some of the barriers to exercising outdoors that some employees may face. **Method:** In this pilot study, we examine the influence of physical activity and virtual or actual nature contact on affect, boredom, and satisfaction when experienced during a break from a demanding work task. Twenty-five employed adults participated in an online study in which they completed a problem-solving task, completed a twenty-minute break, and then completed another session of the problem-solving task. During the break, participants were randomized to either a control condition, a physical activity and low-fidelity virtual nature contact condition, a physical activity and high-fidelity virtual nature contact condition, or a physical activity and actual nature contact condition. **Results:** An examination of the means of affect, boredom, and satisfaction before, during, and after the break revealed that those in high-fidelity virtual nature and actual nature contact conditions seemed to report more positive well-being during the break. **Conclusion:** The results highlight that to help employees recover from work demands, it could be important to take breaks, be physically active, and have contact with nature, which should be simulated in high fidelity if actual nature contact cannot be achieved.

Horan et al. 2023.

International Journal of Environmental Research and Public Health, vol. 20, no. 10.

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Keywords: Nature contact; physical activity; restorative environments; virtual reality; work recovery.

Evidence Level: 3B

Link: <https://www.mdpi.com/1660-4601/20/10/5797>

Trends in robotics research in occupational safety and health: A scientometric analysis and review

Background: Robots have been deployed in workplaces to assist, work alongside, or collaborate with human workers on various tasks, which introduces new occupational safety and health hazards and requires research efforts to address these issues. **Method:** This study investigated the research trends for robotic applications in occupational safety and health. The scientometric method was applied to quantitatively analyze the relationships between robotics applications in the literature. The keywords "robot", "occupational safety and health", and their variants were used to find relevant articles. **Results:** A total of 137 relevant articles published during 2012-2022 were collected from the Scopus database for this analysis. Keyword co-occurrence, cluster, bibliographic coupling, and co-citation analyses were conducted using VOSviewer to determine the major research topics, keywords, co-authorship, and key publications. Robot safety, exoskeletons and work-related musculoskeletal disorders, human-robot collaboration, and monitoring were four popular research topics in the field. Finally, research gaps and future research directions were identified based on the analysis results, including additional efforts regarding warehousing, agriculture, mining, and construction robots research; personal protective equipment; and multi-robot collaboration. **Conclusion:** The major contributions of the study include identifying the current trends in the application of robotics in the occupational safety and health discipline and providing pathways for future research in this discipline.

Liang et al. 2023.

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Keywords: Occupational safety and health; research trends; robotics; scientometric analysis.

Evidence Level: 6A

Link: <https://www.mdpi.com/1660-4601/20/10/5904>

A randomized-controlled trial of a digital, small incentive-based intervention for working adults with short sleep

Background: We evaluated the efficacy of a digitally delivered, small and scalable incentive-based intervention program on sleep and wellbeing in short-sleeping, working adults. **Method:** A 22-week, parallel-group, randomized-controlled trial was conducted on 21-40 y participants gifted with Fitbit™ devices to measure sleep for ≥ 2 years, as part of a broader healthy lifestyle study. About 225 short sleepers (141 males; average time-in-bed, TIB < 7h) were randomly assigned in a 2:1 ratio to Goal-Setting or Control groups. The Goal-Setting group received health vouchers (~USD 0.24) for meeting each sleep goal (i.e. increasing weeknight TIB by 30 min/sleeping before midnight). The study spanned three phases: (1) 2-week Baseline, (2) 10-week Intervention, and (3) 10-week Follow-Up. Wellbeing questionnaires were administered on Weeks 1-2, 11-12, and 21-22. **Results:** Baseline weeknight TIB (mean \pm SD) was 387 \pm 43 min (Goal-Setting) and 399 \pm 44 min (Control), while bedtime was 00:53 \pm 01:13 (Goal-Setting), and 00:38 \pm 00:56 (Control). No difference in sleep outcomes was observed at study endpoints, but exploratory week-by-week analysis showed that on Weeks 3-5, TIB in the Goal-Setting group increased (9-18 min; $p < 0.05$) while on Week 5, bedtimes shifted earlier (15 min; $p < 0.01$) compared to Baseline. Morning sleepiness was reduced in the Goal-Setting group (mean[SEM] = -3.17(1.53); $p = 0.04$) compared to Baseline, although between-group differences were not significant ($p = 0.62$). Main barriers to sleeping longer were work hours (35%), followed by leisure activities (23%) and family commitments (22%). **Conclusion:** Our program resulted in encouraging subjective sleep improvements and short-term sleep extension, but sustained transformation of sleep will probably require structural measures to overcome significant obstacles to sleep.

Ong et al. 2023.

Sleep, vol. 46, no. 5.

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Keywords: Incentives; mHealth; objective sleep monitoring; personalized sleep intervention; short sleep.

Evidence Level: 2A

Link: <https://academic.oup.com/sleep/article/46/5/zsac315/6955801?login=true>

Autistic employees' technology-based workplace accommodation preferences survey-preliminary findings

Background: There has been an increase in the number of research studies focused on the design of accommodations aimed at improving the well-being and work performance of autistic employees. These accommodations took various forms; some of them were based on modification of management practices, for example, support in the area of effective communication, or involved modifications to the physical working environment aimed at limiting sensory vulnerabilities. Many of these solutions were based on digital technology. **Method:** This quantitative research aimed to learn about the opinions of the autistic respondents as potential end users and their assessment of the proposed solutions within four main challenge areas: (1) effective communication; (2) time management, task prioritizing, and organization of work; (3) stress management and emotion control; and (4) sensory sensitivities. **Results:** Respondents gave the highest ratings to solutions aimed at limiting overstimulation and a flexible approach toward working time, support of a job coach, remote work, and support by allowing electronic-mediated communication based on non-direct contact. **Conclusion:** The results can be the starting point for further research on the highest rated solutions dedicated to improving working conditions and the well-being of autistic employees and can be an inspiration for employers who plan to introduce such solutions.

Tomczak et al. 2023.

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Keywords: Assistive technology; autism; neurodiversity; quantitative research; survey; technology-based accommodations; work environment.

Evidence Level:

Link: <https://www.mdpi.com/1660-4601/20/10/5773>