



Emerging Evidence Alert May 2020

This Emerging Evidence Alert 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. It provides a review of recent journal articles and relevant content related to Comcare’s five research themes: Fostering Work Participation; Building Employer Capability; Adapting to the Future of Work; Guiding and Supporting Mental Health and Wellbeing; and Enabling Healthy and Safe Workplaces. Collated articles were published in April 2020 only.

Contents

Building resilience to support technology acceptance	2
Comcare resources: COVID-19 mental health series.....	2
Description of evidence levels definitions used in this review.....	3
Fostering Work Participation.....	4
Return to Work	4
Presenteeism and Absenteeism	4
Building Employer Capability.....	6
Shift Work	6
Management and Leadership.....	8
Work Ability.....	8
Adapting to the Future of Work	10
Technology	10
Aging Workforce.....	10
Guiding and Supporting Mental Health and Wellbeing.....	12
Mental Health.....	12
Bullying and Harassment	14
Psychosocial Issues – Risk Factors	15
Psychosocial Issues – Assessment and Management.....	16
Burnout.....	17
Enabling Healthy and Safe Workplaces.....	18
Health and Wellbeing.....	18
Work Health and Safety	20
Risk Assessment.....	22
Occupational Exposure.....	23
Asbestosis and Mesothelioma	27
Sedentary Practices	27
Physical Activity	28
Manual Handling	29
Musculoskeletal Health.....	29

Building resilience to support technology acceptance

Embracing new technologies has been a reality for many Australians during COVID-19. Over the past few weeks, some of us have set up a workspace at home and others have used different technologies at work to stay connected to our colleagues and loved ones.

As many of us prepare for new ways of working that combine our practices from during and before COVID-19, a [new study](#) has found resilience may be critical to our transition.

The research shows resilience was a key driver for accepting new technology in a survey of 598 workers from an Italian company that had recently introduced new technologies and automating systems. The results were consistent for both white- and blue-collar workers, and also highlighted some practical findings for workplace change management models and practices.

Employers have a fundamental role to play in ongoing transformation and change. The study noted that employers were more likely to lead a motivated and engaged workplace when employee suggestions and ideas for improving the work environment were taken on board.

This is one of the first studies to explore the relationship between technology acceptance and employee engagement.

Comcare resources: COVID-19 mental health series

Over the past few weeks, Australians have been adapting to significant change. COVID-19 has been a challenging time that has meant finding new ways of working and connecting with our colleagues and loved ones. For most of us, this period of extended isolation has tested our resilience and readiness for change, which will help us as we transition back to our usual places of work.

Comcare has developed a series of factsheets to help Australian employers and employees look after their mental health during COVID-19 along with WHS guidance on working from home. This series continues to grow with further resources to come. Read more about Comcare's [COVID-19 fact sheet series](#).

For more information about the Coronavirus and work health and safety please visit:

Comcare website: [Coronavirus](#)

Safe Work Australia: [Coronavirus \(COVID-19\): Advice for Employers](#)

Department of Health: [Coronavirus \(COVID-19\) health alert](#)

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

Fostering Work Participation

Return to Work

The challenge of return to work in workers with cancer: employer priorities despite variation in social policies related to work and health.

Purpose: This study explored employer's perspectives on (1) their experience of good practice related to workers diagnosed with cancer and their return to work (RTW), and (2) their perceived needs necessary to achieve good practice as reported by employers from nine separate countries. **Methods:** Twenty-five semi-structured interviews were held in eight European countries and Israel with two to three employers typically including HR managers or line managers from both profit and non-profit organisations of different sizes and sectors. Interviews were recorded and transcribed verbatim. A grounded theory/thematic analysis approach was completed. **Results:** Employers' experience with RTW assistance for workers with cancer appears to be a dynamic process. Results indicate that good practice includes six phases: (1) reacting to disclosure, (2) collecting information, (3) decision-making related to initial actions, (4) remaining in touch, (5) decision-making on RTW, and (6) follow-up. The exact details of the process are shaped by country, employer type, and worker characteristics; however, there was consistency related to the need for (1) structured procedures, (2) collaboration, (3) communication skills training, (4) information on cancer, and (5) financial resources for realizing RTW support measures. **Conclusions:** Notwithstanding variations at country, employer, and worker levels, the employers from all nine countries reported that good practice regarding RTW assistance in workers with a history of cancer consists of the six phases above. Employers indicate that they would benefit from shared collaboration and resources that support good practice for this human resource matter. **Implications:** Further research and development based on the six phases of employer support as a framework for a tool or strategy to support workers with a history of cancer across countries and organisations is warranted.

De Rijk et al. 2020.

Journal of Cancer Survivorship, vol. 14, no. 2.

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

Keywords: Cancer; Cross-country variations; Employer; Qualitative; Return-to-work

Evidence Level: 5A

Link: <https://link.springer.com/article/10.1007%2Fs11764-019-00829-y>

Presenteeism and Absenteeism

Sickness absence and sickness presence in relation to office type: An observational study of employer-recorded and self-reported data from Sweden

Objectives: Previous research suggesting that open-plan office environments are associated with higher rates of sickness absence rely on self-reports which can be affected by recall bias. This paper investigates the associations of sickness absence, obtained from employer records as well as self-reports, with office type (cell offices and different sizes of open-plan offices). It additionally studies whether office type is associated with sickness presence. **Methods:** Employees from two private and one public sector organization were recruited to the study. Office type was ascertained by direct observation or from employee responses to an online survey. Control variables were gender, age, public/private sector and education level. Number of days and episodes of sickness absence were calculated from employer absence records and regressed on office type using negative binomial regression ($n = 988$). Self-reports of sickness absence and presence were regressed on office type using ordered logistic regression ($n = 1237$). **Results:** Office type was generally not associated with employer records of number of episodes or days of sickness absence, except that the total number of days of leave was higher in flex offices compared to cell offices ($IRR = 2.46$, $p = 0.007$). In general, office type was not associated with self-reported days of sickness absence, apart from participants working in medium-sized open-plan offices who had 0.42 higher log-odds of absence than those working in cell offices ($p = 0.004$). Office type was not associated with self-reported sickness presence. **Conclusions:** Office type was not associated with sickness presence nor, in general, with sickness absence, whether obtained from self-reports or company records. It is not possible to conclude

from this study that open-plan offices are associated with greater sickness absence or sickness presence compared to cell offices.

Platts et al. 2020.

PLoS One, vol. 15, no. 4.

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

Keywords: Sickness absence; Sickness presence; Office; Open plan; Cell office

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231934>

The impact of the direct participation of workers on the rates of absenteeism in the Spanish labor environment

The aim of this research was to study the relationship between the different levels of direct participation of workers (passive, consultative or active-delegated) in risk prevention management with the levels of absenteeism in Spain. To this end, a transversal study was carried out using microdata from the Second European Survey of Companies on New and Emerging Risks (ESENER-2-Spain, 2014) with a master population of 3162 work centres. A multinomial logistic regression model was carried out, with the dependent variable being the levels of absenteeism and the independent variables, the participation indicators and preventive management, calculating the adjusted odds ratio (aOR) between all the independent and control variables, with their corresponding 95% confidence intervals (95% IC). The results obtained showed how the active-delegative participation of workers in the design and adoption of psychosocial risk prevention measures reported 2.33 less probabilities of having a very high or fairly high level of absenteeism (aOR = 0.43; 95%IC:0.27-0.69). However, having documented aspects of preventive management (plan, risk assessment, planning measures) did not have any impact on absenteeism levels, which shows that we can fall into an unrealistic institutional mirage of security with active policies of co-education or co-management being necessary to reduce absenteeism.

Paya et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Co-management; Direct participation; Multinomial logistic regression; Prevention management; Preventive culture; Work absenteeism

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/7/2477>

Preventing sickness absence among employees with common mental disorders or stress-related symptoms at work: a cluster randomised controlled trial of a problem-solving-based intervention conducted by the Occupational Health Services

Objectives: Common mental disorders (CMDs) are among the main causes of sickness absence and can lead to suffering and high costs for individuals, employers and the society. The occupational health service (OHS) can offer work-directed interventions to support employers and employees. The aim of this study was to evaluate the effect on sickness absence and health of a work-directed intervention given by the OHS to employees with CMDs or stress-related symptoms. **Methods:** Randomisation was conducted at the OHS consultant level and each consultant was allocated into either giving a brief problem-solving intervention (PSI) or care as usual (CAU). The study group consisted of 100 employees with stress symptoms or CMDs. PSI was highly structured and used a participatory approach, involving both the employee and the employee's manager. CAU was also work-directed but not based on the same theoretical concepts as PSI. **Outcomes** were assessed at baseline, at 6 and at 12 months. Primary outcome was registered sickness absence during the 1-year follow-up period. Among the secondary outcomes were self-registered sickness absence, return to work (RTW) and mental health. **Results:** A statistical interaction for group × time was found on the primary outcome (p=0.033) and PSI had almost 15 days less sickness absence during follow-up compared with CAU. Concerning the secondary outcomes, PSI showed an earlier partial RTW and the mental health improved in both groups without significant group differences. **Conclusion:** PSI was effective in reducing sickness absence which was the primary outcome in this study.

De Poll et al. 2020.

Occupational and Environmental Medicine.

User License: *Creative Commons - Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)*

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

Keywords: OH services; Intervention studies; Mental health; Public health; Sickness absence

Evidence Level: 2A

Link: <https://oem.bmj.com/content/early/2020/04/13/oemed-2019-106353.long>

Cardiovascular reactivity to acute stress associated with sickness absence among Japanese men and women: A prospective study

Objective: We aimed to investigate associations between cardiovascular reactivity to acute stress and sickness absence among Japanese male and female workers, in a prospective study. **Methods:** Among healthy employed Japanese workers who underwent mental health checks between 2006 and 2009, data of 111 participants were analyzed. Changes in blood pressure, pulse rate, peripheral blood flow (PBF), and heart rate variability (HRV) (high frequency [HF] and low frequency [LF]) were calculated using differences between the two tasks, mirror drawing stress [MDS] and a maze task, and the post period value. Sickness absence through March 2010 was followed up by mail survey (average follow-up 2.3 years). Logistic regression analysis was used, adjusting for lifestyle factors. **Results:** Among 12 participants who took sickness absences, eight were owing to mental problems. Changes in the LF during the MDS and maze tasks and LF-to-HF ratio during the MDS task were positively associated with all sickness absences (odds ratio [OR], 95% confidence interval [CI]: 2.09, 1.03-4.22; 2.04, 1.09-3.82; and 3.10, 1.46-6.58, respectively). Changes in PBF during the MDS task were also associated with increased risk of sickness absence (OR, 95% CI: 2.53, 1.10-5.81). **Conclusion:** Cardiovascular reactivity to acute stress should be considered at workers' health checks.

Hirokawa et al. 2020.

Brain and Behavior, vol. 10, no. 4.

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

Keywords: Japanese workers; Autonomic reactivity to stress; Heart rate variability; Mental problems; Prospective study; Sickness absence

Evidence Level: 4B

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/brb3.1541>

Building Employer Capability

Shift Work

Shift work and long work hours and their association with chronic health conditions: A systematic review of systematic reviews with meta-analyses.

Background: Previous reviews have demonstrated that shift work and long work hours are associated with increased risk for chronic conditions. However, these reviews did not comprehensively assess the body of evidence, and some were not conducted in a systematic manner. A better understanding of the health consequences of shift work and long work hours will aid in creating policy and practice recommendations. This review revisits the epidemiologic evidence on the association of shift work and long work hours with chronic conditions with particular emphasis on assessing the quality of the evidence. **Methods and Findings:** We conducted a systematic review of systematic reviews with meta-analyses (SR-MA) that assessed the link between shift work or long work hours and chronic conditions (PROSPERO CRD42019122084). We evaluated the risk of bias of each SR-MA using AMSTAR v2 and assessed the overall evidence for each condition using the GRADE approach. We included 48 reviews covering cancers, cardiovascular diseases, metabolic syndrome and related conditions, pregnancy complications, depression, hypertension, and injuries. On average, only 7 of 16 AMSTAR items were fulfilled. Few SR-MAs had a registered protocol and nearly all failed to conduct a comprehensive search. We found moderate grade evidence linking shift work to breast cancer and long work hours to stroke. We found low grade evidence linking both shift work and long work hours with low to moderate increase in risk for some pregnancy complications and cardiovascular diseases. Low grade evidence also link long work hours and depression.

Conclusions: Moderate grade evidence suggest that shift work and long work hours increase the risk of breast cancer and stroke, but the evidence is unclear on other chronic conditions. There is a need for high-quality studies to address this gap. Stakeholders should be made aware of these increased risks, and additional screening and prevention should be considered, particularly for workers susceptible to breast cancer and stroke.

Rivera et al. 2020.

PLoS One, vol. 15, no. 4.

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

Keywords: Shift work; Long hours; Chronic health conditions; Systematic review

Evidence Level: 1A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231037>

The mediating role of sleep, physical activity, and diet in the association between shift work and respiratory infections

Objectives: Shift work may be associated with an increased incidence of respiratory infections. However, underlying mechanisms are unclear. Therefore, our aim was to examine the mediating role of sleep, physical activity, and diet in the association between shift work and respiratory infections. **Methods:** This prospective cohort study included 396 shift and non-shift workers employed in hospitals. At baseline, sleep duration and physical activity were measured using actigraphy and sleep/activity diaries, sleep quality was reported, and frequency of meal and snack consumption was measured using food diaries. In the following six months, participants used a smartphone application to report their influenza-like illness/acute respiratory infection (ILI/ARI) symptoms daily. Mediation analysis of sleep, physical activity, and diet as potential mediators of the effect of shift work on ILI/ARI incidence rate was performed using structural equation modeling with negative binomial and logistic regression. **Results:** Shift workers had a 23% [incidence rate ratio (IRR) 1.23, 95% CI 1.01-1.49] higher incidence rate of ILI/ARI than non-shift workers. After adding the potential mediators to the model, this reduced to 15% (IRR 1.15, 95% CI 0.94-1.40). The largest mediating (i.e., indirect) effect was found for poor sleep quality, with shift workers having 29% more ILI/ARI episodes via the pathway of poorer sleep quality (IRR 1.29, 95% CI 1.02-1.95). **Conclusions:** Compared to non-shift workers, shift workers had a higher incidence rate of ILI/ARI that was partly mediated by poorer sleep quality. Therefore, it may be relevant for future research to focus on perceived sleep quality as an underlying mechanism in the relation between shift work and increased infection susceptibility.

Loef et al. 2020.

Scandinavian Journal of Work and Environmental Health.

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

Keywords: Shift work; Sleep; Physical activity; Diet; Respiratory infections

Evidence Level: 4A

Link: https://www.sjweh.fi/show_abstract.php?abstract_id=3896

Effects of shift work on the eating behavior of police officers on patrol.

Recent studies indicate that the timing of food intake can significantly affect metabolism and weight management. Workers operating at atypical times of the 24-h day are at risk of disturbed feeding patterns. Given the increased risk of weight gain, obesity and metabolic syndrome in shift working populations, further research is required to understand whether their eating behavior could contribute to these increased metabolic risks. The objective of this study was to characterize the dietary patterns of police officers across different types of shifts in their natural environments. Thirty-one police officers (six women; aged 32.1 ± 5.4 years, mean \pm SD) from the province of Quebec, Canada, participated in a 28- to 35-day study, comprising 9- to 12-h morning, evening, and night shifts alternating with rest days. Sleep and work patterns were recorded with actigraphy and diaries. For at least 24 h during each type of workday and rest day, participants logged nutrient intake by timestamped photographs on smartphones. Macronutrient composition and caloric content were estimated by registered dietitians using the Nutrition Data System for Research database. Data were analyzed with linear mixed effects models and circular ANOVA. More calories were consumed relative to individual metabolic requirements on rest days than both evening- and night-shift days ($p = 0.001$), largely sourced from increased fat ($p = 0.004$) and carbohydrate (trend, $p =$

0.064) intake. Regardless, the proportions of calories from carbohydrates, fat, and protein did not differ significantly between days. More calories were consumed during the night, between 2300 h and 0600 h, on night-shift days than any other days ($p < 0.001$). Caloric intake occurred significantly later for night-shift days ($2308 \text{ h} \pm 0114 \text{ h}$, circular mean \pm SD) than for rest days ($1525 \text{ h} \pm 0029 \text{ h}$; $p < 0.01$) and was dispersed across a longer eating window ($13.9 \text{ h} \pm 3.1 \text{ h}$ vs. $11.3 \text{ h} \pm 1.8 \text{ h}$, mean \pm SD). As macronutrient proportions were similar and caloric intake was lower, the finding of later meals times on night-shift days versus rest days is consistent with emerging hypotheses that implicate the biological timing of food intake-rather than its quantity or composition-as the differentiating dietary factor in shift worker health.

Kosmadopoulos et al. 2020.

Nutrients, vol. 12, no. 4.

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

Keywords: Caloric intake; Chronobiology; Chrononutrition; Dietary intake; Eating patterns; Food choice; Food timing; Macronutrients; Shift work

Evidence Level: 4B

Link: <https://www.mdpi.com/2072-6643/12/4/999>

Management and Leadership

Guanxi HRM practice and employees' occupational well-being in China: A multi-level psychological process

Chinese employees may experience and respond to guanxi human resource management (HRM) practice (e.g., recruiting, selecting, inducting and appraising employees based on personal relationships). Little has been done to examine the linkage between guanxi HRM practice and employees' occupational well-being. This study investigates the psychological process of how guanxi HRM practice affects employees' occupational well-being. The theoretical model of this study proposes that employee psychological safety mediates the relationship between guanxi HRM practice and occupational well-being, while collectivistic team culture moderates the relationship between guanxi HRM practice and psychological safety. Multi-level data from 297 employees nested within 42 teams support all hypotheses. This study reveals the cross-level effects of guanxi HRM practice and providing practical suggestions for future research on psychologically safe and healthy work environments.

Xu et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Collectivistic culture; Guanxi HRM practice; Occupational well-being; Psychological safety

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/7/2403>

Work Ability

Mediating factors for the relationship between stress and work ability over time in young adults.

Stress can affect work ability. The aim of this study was to identify how this pathway is mediated over time in young adults. Participants of the Work Ability in Young Adults cohort were selected. A theoretical framework was built, which lead to a statistical model. Selected dimensions of mediators were recovery, work demands affecting private life, feelings of control over private life, and physical activity in leisure time. A quadruple serial mediation model was built with four mediators. The total effect of stress on work ability was -0.3955 , 95% CI $[-0.4764, -0.3146]$. The total indirect effect amounted to 81% with an effect of -0.3182 , 95% CI $[-0.3750, -0.2642]$. The relationship between stress and Work Ability Score five years later in young adults was mediated by stress five years later, work demands affecting private life, feelings of control over private life and feeling well-rested upon waking. These results indicate that work demands affecting private life and feelings of control over private life are important mediators of the relationship between stress and work ability in young adults. A well-balanced relationship between work and private life can counteract the influence of stress on work ability in this age group.

Van Schaijk et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Mediation; Sustainable employability; Work ability score; Work-private life balance

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/7/2530>

Lifestyle, sick leave and work ability among Norwegian employees with asthma - A population-based cross-sectional survey conducted in Telemark County, Norway.

Objective: To investigate whether physician-diagnosed asthma modifies the associations between multiple lifestyle factors, sick leave and work ability in a general working population. **Methods:** A cross-sectional study was conducted in Telemark County, Norway, in 2013. A sample of 16 099 respondents completed a self-administered questionnaire. We obtained complete data on lifestyle, work ability and sick leave for 10 355 employed persons aged 18-50 years. We modelled sick leave and work ability using multiple logistic regression, and introduced interaction terms to investigate whether associations with lifestyle factors were modified by asthma status. **Results:** Several lifestyle risk factors and a multiple lifestyle risk index were associated with sick leave and reduced work ability score among persons both with and without physician-diagnosed asthma. A stronger association between lifestyle and sick leave among persons with asthma was confirmed by including interaction terms in the analysis: moderate lifestyle risk score * asthma OR = 1.4 (95% CI 1.02-2.1); high lifestyle risk score * asthma OR = 1.6 (95% CI 1.1-2.3); very high lifestyle risk score * asthma OR = 1.6 (95% CI 0.97-2.7); obesity * asthma OR = 1.5 (95% CI 1.02-2.1); past smoking * asthma OR = 1.4 (95% CI 1.01-1.9); and current smoking * asthma OR = 1.4 (95% CI 1.03-2.0). There was no significant difference in the association between lifestyle and work ability score among respondents with and without asthma. **Conclusions:** In the present study, we found that physician-diagnosed asthma modified the association between lifestyle risk factors and sick leave. Asthma status did not significantly modify these associations with reduced work ability score. The results indicate that lifestyle changes could be of particular importance for employees with asthma.

De Bortoli et al. 2020.

PLoS One, vol. 15, no. 4.

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

Keywords: Work ability; Lifestyle; Sick leave; Asthma; Employees

Evidence Level: 4A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231710>

Long-term work retention after treatment for cancer: a systematic review and meta-analysis.

Purpose: Almost half of people diagnosed with cancer are working age. Survivors have increased risk of unemployment, but little is known about long-term work retention. This systematic review and meta-analysis assessed work retention and associated factors in long-term cancer survivors. **Methods:** We searched Medline/PubMed, Embase, PsychINFO, and CINAHL for studies published 01/01/2000-08/01/2019 reporting work retention in adult cancer survivors ≥ 2 years post-diagnosis. Survivors had to be in paid work at diagnosis. Pooled prevalence of long-term work retention was estimated. Factors associated with work retention from multivariate analysis were synthesized. **Results:** Twenty-nine articles, reporting 21 studies/datasets including 14,207 cancer survivors, were eligible. Work retention was assessed 2-14 years post-diagnosis. Fourteen studies were cross-sectional, five were prospective, and two contained both cross-sectional and prospective elements. No studies were scored as high quality. The pooled estimate of prevalence of long-term work retention in cancer survivors working at diagnosis was 0.73 (95%CI 0.69-0.77). The proportion working at 2-2.9 years was 0.72; at 3-3.9 years 0.80; at 4-4.9 years 0.75; at 5-5.9 years 0.74; and 6+ years 0.65. Pooled estimates did not differ by cancer site, geographical area, or study design. Seven studies assessed prognostic factors for work retention: older age, receiving chemotherapy, negative health outcomes, and lack of work adjustments were associated with not working. **Conclusion:** Almost three-quarters of long-term cancer survivors working at diagnosis retain work. **Implications:** These findings are pertinent for guidelines on cancer survivorship care. Professionals could focus support on survivors most likely to have poor long-term work outcomes.

De Boer et al. 2020.

Journal of Cancer Survivorship, vol. 14, no. 2.

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

Keywords: Cancer; Employment; Longitudinal studies; Meta-analysis; Prospective studies; Return-to-work; Work ability; Work retention

Evidence Level: 1A

Link: <https://link.springer.com/article/10.1007/s11764-020-00862-2>

Adapting to the Future of Work

Technology

The promotion of technology acceptance and work engagement in industry 4.0: From personal resources to information and training

Thanks to the rapid advances of technology, we are currently experiencing the fourth industrial revolution, which is introducing several changes in how organizations operate and how people learn and do their work. Many questions arise within this framework about how these transformations may affect workers' wellbeing, and the Work and Organizational Psychology is called upon to address these open issues. This study aims to investigate personal and organizational antecedents (resilience, goal orientation and opportunities for information and training) and one consequence (work engagement) of technology acceptance within factories, comparing white- and blue-collar workers. The study involved a sample of 598 workers (white-collar = 220, blue-collar = 378) employed at an Italian company who filled in a self-report questionnaire. In both samples, the multi-group structural equation model showed a positive relationship between resilience, opportunities for information and training, and technology acceptance, which in turn showed a positive association with work engagement. All indirect effects were significant. This study investigated the motivational dynamics related to the introduction of new technologies within factories involving the little-studied population of blue-collar workers. Results highlighted the importance of providing information and opportunities for training to all employees, in order to support Industry 4.0 transformations without impacting on workers' motivation.

Molino et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Industry 4.0; Personal resources; Technology acceptance; Training; Work engagement

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/7/2438>

Aging Workforce

Barriers and opportunities for prolonging working life across different occupational groups: the SeniorWorkingLife study.

Background: Increasing retirement age is a pivotal issue in labour market reforms. This study analyses factors conditioning retirement intentions. **Methods:** In SeniorWorkingLife, 11 444 employed workers ≥ 50 years replied to questions in random order about expected reasons for leaving and potential reasons for staying longer at the labour market. Respondents were stratified based on the Danish version of International Standard Classification of Occupations (ISCO). Representative estimates were produced using the SurveyFreq and SurveyLogistic procedures of SAS combined with model-assisted weights based on national registers. **Results:** For ISCO groups 1-4 (seated work) main expected reasons for retiring were freedom to choose and desire for more leisure time, but many would consider staying longer if there were better possibilities for additional senior days, longer vacations and flexible working hours. For ISCO groups 5-9 (physical work), poor physical health and not being capable of doing the job were common expected reasons for retiring, but many would consider staying longer if the work were less physically demanding and there were more senior days. Possibility for pension was a general expected reason for retiring. Expected reasons differed to a less extent between genders than between ISCO groups, e.g. economic factors were more important for men and high work demands more important for women. **Conclusion:**

Different barriers and opportunities for prolonging working life exist across different occupational groups of the labour market-with most consistent differences between those with seated and physical work. Targeting these specifically seems opportune for policy makers and future interventions.

Andersen et al. 2020.

European Journal of Public Health, vol. 30, no. 2.

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: Barriers; Opportunities; Working life; Occupational groups; Senior; Employed worker

Evidence Level: 5A

Link: <https://academic.oup.com/eurpub/article/30/2/241/5556359>

Health-related work limitations among older workers-the role of flexible work arrangements and organizational climate

Background: Given their increasing prevalence with age, chronic health conditions (CHCs) are substantially affecting older workers and organizations. An important question is whether and how flexible work arrangements and organizational climates may help to reduce the work limitations experienced by older workers. Grounded on the Job Demand-Resource model, we hypothesize that access to flexible work arrangements (working-time flexibility, workplace flexibility, phased retirement) and supportive organizational climates (healthy ageing climate, psychological safety climate) are vital job resources that are associated with fewer health-related work limitations among older workers experiencing CHCs.

Methods: Multilevel data were collected among 5,419 older workers (60-65 years) in 624 organizations in the Netherlands. Perceived health-related work limitations of older workers diagnosed with arthritis (N = 2,330), cardiovascular disease (N = 720), and sleep disorders (N = 816) were analyzed. **Results:** Multilevel ordered logistic regression analyses revealed that perceived access to flexible working hours and a psychologically safe organizational climate was associated with fewer health-related work limitations among older workers with CHCs. **Implications:** Facilitating longer working lives is a key policy challenge within organizations, in particular if older workers are constraint by CHCs. This study shows that offering flexible working hours and ensuring a psychologically safe climate, where older workers with health issues are inclined to share their work needs and preferences, are likely to contribute to healthy ageing in the workplace.

Vanajan et al. 2020.

The Gerontologist, vol. 60, no. 3.

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

Keywords: Chronic illness; Environment; Organizational policies and practices; Successful ageing; Work

Evidence Level: 4A

Link: <https://academic.oup.com/gerontologist/article/60/3/450/5509617>

Educational differences in the influence of health on early work exit among older workers.

Objectives: Previous research has shown that poor physical and mental health are important risk factors for early work exit. We examined potential differences in this association in older workers (50+) across educational levels. **Methods:** Coordinated analyses were carried out in longitudinal data sets from four European countries: the Netherlands (Longitudinal Aging Study Amsterdam), Denmark (Danish Longitudinal Study of Ageing), England (English Longitudinal Study of Ageing) and Germany (German Ageing Survey). The effect of poor self-rated health (SRH), functional limitations and depression on different types of early work exit (early retirement, economic inactivity, disability and unemployment) was examined using Cox regression analysis. We examined educational differences in these effects by testing interaction terms.

Results: Poor physical and mental health were more common among the lower educated. Poor SRH, functional limitations, and depression were all associated with a higher risk of early work exit. These health effects were strongest for the disability exit routes (poor SRH: HRs 5.77 to 8.14; functional limitations: HRs 6.65 to 10.42; depression: HRs 3.30 to 5.56). In the Netherlands (functional limitations) and England (functional limitations and SRH), effects were stronger in the lower educated. **Conclusions:** The prevalence of health problems, that is, poor SRH, functional limitations and depression, was higher in the lower educated workers. All three health indicators increase the risk of early work exit. In some countries, health

effects on early exit were stronger in the lower educated. Thus, lower educated older workers are an important target group for health policy and intervention.

De Breij et al. 2020.

Occupational and Environmental Medicine.

User License: *Creative Commons - Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)*

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

Keywords: Older workers; Early work exit; Education; Physical health; Mental health

Evidence Level: 4A

Link: <https://oem.bmj.com/content/early/2020/04/08/oemed-2019-106253.long>

Guiding and Supporting Mental Health and Wellbeing

Mental Health

Which autistic traits are related to depressive symptoms in Japanese workers?

Individuals with autism spectrum disorders are at a high risk of experiencing depressive symptoms. However, the relationship between autistic traits and depressive symptoms is unclear. This study aimed to identify which autistic traits are related to depressive symptoms in Japanese workers. The study participants included 2,049 workers from all areas of Japan. Autistic traits and depressive symptoms were measured using an abridged Japanese version of the Autism-Spectrum Quotient (AQ-Short) and the Japanese version of the K6 scale, respectively. The AQ-Short comprises five autistic trait subcomponents that assess fascination for numbers/patterns, difficulties with imagination, preference for routine, difficulties with social skills, and attention-switching difficulties. Linear regression analyses were performed to estimate the association between total and subcomponent autistic trait scores and depressive symptoms. Participants with higher total autistic trait scores were significantly more likely to have depressive symptoms ($p < 0.001$). When scores on the five autistic trait subcomponents were entered simultaneously into the model, participants with higher scores on all subcomponents other than 'difficulties with imagination' were significantly more likely to report depressive symptoms. Total autistic traits and autistic trait subcomponents could be used for early detection of the risk of depressive symptoms.

Suzuki et al. 2020.

Industrial Health.

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: Autism spectrum disorders; Autism-Spectrum Quotient; Autistic traits; Depressive symptoms; Imagination

Evidence Level: 4B

Link: https://www.jstage.jst.go.jp/article/indhealth/advpub/0/advpub_2019-0206/_article

Effects of procedural justice on prospective antidepressant medication prescription: a longitudinal study on Swedish workers

Background: Procedural justice has been linked to several mental health problems, but most studies have used self-reported data. There exists a need to assess the link between procedural justice and health using outcomes that are not only self-reported. The aim of the current study was to examine whether perceived procedural justice at work is prospectively associated with antidepressant medication prescription.

Methods: Data from 4374 participants from the Swedish Longitudinal Survey of Health (SLOSH) were linked to the Swedish National Prescribed Drug register. Based on their perceived procedural justice at two times (2010 and 2012), participants were divided into four groups: stable low, increasing, decreasing and stable high justice perceptions. Using Cox regression, we studied how the course of stability and change in perceived procedural justice affected the rate of prescription of antidepressant medication over the next 2 years. Participants with missing data and those who had been prescribed antidepressant medication in the period leading up to 2012 were excluded in the main analyses to determine incident morbidity. **Results:** The results showed that after adjustment for sex, age, education, socioeconomic position, marital status,

and insecure employment a decrease in perceived procedural justice over time was associated with greater receipt of antidepressants compared to people with stable high perceptions of procedural justice (HR 1.76, 95% CI: 1.16 to 2.68). Being female and having insecure employment were also associated with higher hazards of antidepressant prescription. **Conclusions:** These findings strengthen the notion that procedural justice at work influences psychological well-being, as well as provide new insights into how procedural justice perceptions may affect mental health.

Persson et al. 2020.

BMC Public Health, vol. 20, no. 1.

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

Keywords: Antidepressant medication; Organizational justice; Prescription medicine; Procedural justice; Register data

Evidence Level: 4B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08560-5>

Associations among employment status, health behaviors, and mental health in a representative sample of South Koreans

The purpose of the present study was to compare the health behaviors, general health, and mental health of South Korean employees according to their employment status, and to examine how these associations vary across genders using the latest Korean National Examination Health and Nutrition Survey data. Logistic regression analyses were performed using employment status-permanent job, temporary job, and unemployed-as predictor variables and health-related variables as the outcome variables. Results indicated that temporary workers and the unemployed have higher odds of poor mental health regardless of gender. On the other hand, only male permanent workers were found to have a higher risk of problematic drinking compared to precarious workers and the unemployed. Meanwhile, only women showed a higher risk of current smoking in the temporary job and unemployed groups compared with permanent employees. Regarding general health, women, not men, in the temporary job group reported poorer general health (i.e., low health-related quality of life and higher self-perceived poor health) than those in other groups. These findings suggest that the development and implementation of intervention services, as well as organizational actions, need to consider differential impacts of unfavorable employment status on health issues according to gender.

Park et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Employment status; General health; Health behavior; Mental health

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/7/2456>

Gender differences in treatment with antidepressants during first weeks of a sick-leave spell due to depressive episode

Background: The incidence of depression is higher in women; women are more often on sick leave due to depression, and more women than men use antidepressants. The objective of this study was to explore possible gender differences in buying prescribed antidepressants during the first 21 days of a new sick-leave spell due to depressive episode. **Methods:** Included were all individuals living in Sweden in working age (18-64 years old) who in 2010 or 2011 began a new sick-leave spell due to depressive episode (ICD-10 F32) lasting at least 21 days (n = 44 863). Register data on sociodemographics, morbidity and dispensed prescription medication were used to investigate associations between gender and buying prescribed antidepressants in the total group and in subgroups, using multiple logistic regression models. **Results:** The study population consisted of 69.5% women. Within the first 21 days of the sick-leave spell, 48.0% of the men and 42.1% of the women had dispensed prescribed antidepressants. In the adjusted multiple logistic regression model, men had an odds ratio of 1.28 (95% confidence interval 1.23-1.33) as compared with women, for buying prescribed antidepressants. **Conclusions:** In this nationwide register study, nearly half of the women and men on sick leave with depressive episode bought prescribed antidepressants during the first three weeks of the sick-leave spell. In the adjusted models, men were more likely to do this. Further studies are needed to elucidate the reasons for this gender difference.

Lytsy et al. 2020.

European Journal of Public Health, vol. 30, no. 2.

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: Gender differences; Antidepressants; Sick leave; Depressive episode

Evidence Level: 4B

Link: <https://academic.oup.com/eurpub/article/30/2/299/5575245>

Effects of psychotic symptoms and social cognition on job retention in patients with Schizophrenia in Korea.

This research examined the relationship between psychotic symptoms, social cognition, and job retention among people with schizophrenia in Korea. Participants (158 people with schizophrenia from 15 mental health institutions) were divided into two groups: those with a job retention period of less than six months (n = 75), and those with a job retention period of six months or more (n = 83). Participants completed a survey packet containing the Brief Psychiatric Rating Scale (BPRS), Global Assessment of Function (GAF) Scale, Interpersonal Relationship Functioning Assessment Scale, Basic Empathy Scale, Hinting Task, and Ambiguous Intention Hostility Questionnaire (AIHQ), and provided their job retention status. We used binomial logistic regression analysis to examine whether job retention was affected by participants' demographic, clinical, and vocational characteristics, as well as the three components of social cognition, i.e., theory of mind, empathy, and attribution style. Results showed that theory of mind (ToM), attribution style, and psychotic symptoms explained 52.7% of the variance in job retention. A higher theory of mind means a higher ability to grasp the intentions of others. The higher theory of mind, the lesser attribution style, and the lesser psychotic symptoms were related to a longer period of job retention.

Han et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: Attribution style; Job retention; Schizophrenia; Social cognition; Theory of mind

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/8/2628>

Bullying and Harassment

Workplace mobbing in Polish and Lithuanian organisations with regard to corporate social responsibility

The 'mobbing' phenomenon is regarded as the actions or behaviour referring to an employee or directed against an employee, comprising persistent and drawn-out harassment or intimidation of that employee. This phenomenon causes substantial negative workplace consequences, but, above all, one should stress the consequences for the victims, which are devastating. This has been observed in a variety of organisations, regardless of the sector and country. Given these facts, the purpose of this study was to identify the prevalence of workplace mobbing in Polish and Lithuanian organisations with regard to corporate social responsibility (CSR). The research sample included a group of 823 entities operating in both countries in both the private and public sectors (410 from Lithuania and 413 from Poland). A closed-type questionnaire was used in the survey. Several research methods including factor analysis, Cronbach's alpha, Spearman-Brown, factor loading, and total item correlation were used in our study. The results achieved showed that there were both similarities as well as differences between the analysed organisations. More specifically, our research revealed that: (1) Employee attitude to CSR depends on the company's sector of activity and the country; (2) In Poland, workplace mobbing is more prevalent in the public sector than in the private, whilst in Lithuania there were no substantial differences; (3) Organisations that implemented the CSR concept showed less imposed mobbing prevalence; and (4) Employees who faced mobbing in the workplace had worse relationships with clients and users of the company's services/products.

Vveinhardt et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: CSR; Lithuania; Poland; Workplace mobbing

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/8/2944>

Psychosocial Issues – Risk Factors

Associations between cognitive and affective job insecurity and incident purchase of psychotropic drugs: A prospective cohort study of Swedish employees

Background: Previous research suggests that job insecurity is associated with poor mental health, but research examining how different aspects of job insecurity relate to clinical measures of poor mental health are lacking. We aimed to investigate the association between cognitive and affective job insecurity and incident purchases of psychotropic drugs. **Methods:** We included 14,586 employees participating in the Swedish Longitudinal Occupational Survey of Health (SLOSH), who answered questions on cognitive and/or affective job insecurity in 2010, 2012 or 2014. Respondents were followed in the Swedish Prescribed Drug Register (2.5 years on average). We investigated the association between job insecurity and incident psychotropic drugs with marginal structural Cox models. **Results:** Affective job insecurity was associated with an increased risk of purchasing any psychotropic drugs (Hazard Ratio (HR) 1.40 (95% Confidence Interval (CI) 1.04-1.89)) while cognitive job insecurity was not (HR 1.15 (95% CI 0.92-1.43)). Cognitive and affective job insecurity were both associated with antidepressants, affective job insecurity with anxiolytics, but no association was found with sedatives. Women and younger workers seemed to have higher risk compared to men and older workers, but differences were not statistically significant. **Limitations:** Although job insecurity and psychotropic drugs were assessed through independent sources and several covariates were considered, unmeasured confounding cannot be ruled out. **Conclusions:** The findings support that affective job insecurity is a risk factor for psychotropic drug treatment, that it may be relevant to distinguish between different types of job insecurity, and to consider sex and age as moderating factors. **Blomqvist et al. 2020.**

Journal of Affective Disorders, vol. 1, no. 266.

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: Job insecurity; Marginal structural models; Psychotropic drugs

Evidence Level: 4A

Link: <https://www.sciencedirect.com/science/article/pii/S0165032719313540?via%3Dihub>

Psychosocial risk, work-related stress, and job satisfaction among domestic waste collectors in the ho municipality of Ghana: A phenomenological study.

Domestic waste collectors play key roles in the collection and disposal of solid waste in Ghana. The work environment and conditions under which domestic waste collectors operate influence their job satisfaction ratings and health outcomes. This study investigated psychosocial risk factors, work-related stress and job satisfaction needs among municipal solid waste collectors in the Ho Municipality of Ghana. A phenomenological design was applied to collect data among 64 domestic waste collectors, 12 managers, and 23 supervisors of two waste companies in Ho Municipality, Ghana. Data were collected from June-August 2018 using in-depth interview and focus group discussion guides. Interviews were supplemented by field observations. Data were analyzed using inductive and deductive content procedures to form themes based on the study aim. Four themes emerged from the study. The study results revealed that domestic waste collector's poor attitudes and safety behaviors such as not wearing personal protective equipment, poor enforcement of safety standards by supervisors and managers, and work-related stress caused by poor working environments impact negatively on domestic waste collector's health and safety. Other factors such as poor enforcement of standard company regulations, poor work relations, non-clear work roles, lack of social protection to meet medical needs, poor remuneration, negative community perceptions of domestic waste collectors job, work environments, and workloads of domestic waste collectors were reported to negatively impact on work stress and job satisfaction needs. In conclusion, the findings are important in informing the necessary waste management policies aimed at improving decent work

environments, as well as improving the health and well-being of domestic waste collectors in both the formal and informal sectors in Ghana.

Lissah et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: Ghana; Domestic waste collectors; Job satisfaction; Psychosocial risk; Safety standard; Solid waste; Work-related stress

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/8/2903>

Reciprocal relations between work stress and insomnia symptoms: A prospective study

Work stress and poor sleep are closely related in cross-sectional data, but evidence from prospective data is limited. We analysed how perceived stress and work stressors (work demands, decision authority and workplace social support) are related to key dimensions of insomnia over time, using structural equation modelling. Biennial measurements from a large sample of the working population in Sweden enabled us to analyse both the relationship from stress to sleep as well as that from sleep to stress. Overall, we found reciprocal relations between insomnia and all four stress measures. However, looking at the relation between each dimension of insomnia and each stress measure, there were some differences in direction of effects. In the direction from stress to sleep, all work stressors as well as perceived stress predicted both difficulties initiating sleep and difficulties maintaining sleep. The same was found for non-restorative sleep, with the exception for decision authority. In the opposite direction, difficulties maintaining sleep predicted increased levels of work demands and perceived stress. Difficulties initiating sleep stood out among the insomnia symptoms as not predicting any of the stress measures, while non-restorative sleep was the only symptom predicting all stress measures. The results advance the understanding of the stress-sleep relationship and indicate a potential vicious circle between insomnia and perceived stress as well as work stressors, suggesting that the workplace could be an arena for interventions to alleviate insomnia.

Garefelt et al. 2020.

Journal of Sleep Research, vol. 29, no. 2.

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: Job demands; Longitudinal; Nonrestorative sleep; Occupational stress; Psychological stress; Sleep initiation and maintenance disorders

Evidence Level: 4A

Link: <https://onlinelibrary.wiley.com/doi/full/10.1111/jsr.12949>

Psychosocial Issues – Assessment and Management

Diverting blame to stay sane - young people's strategies for dealing with the mental health effects of precarious employment: a grounded theory study

Background: Precarious employment is a risk factor for poor mental health, particularly among young adults. Knowledge about how young people maintain their mental health while in a precarious employment situation is scarce. The aim of the study was to explore the meaning of precarious employment for young adults in Sweden and their strategies for maintaining good mental health. **Methods:** In-depth interviews were conducted with 15 individuals (9 men and 6 women) aged 20-39 years in a precarious employment situation. Contact persons at union offices and at specific job-coaching organizations collaborating with the Swedish public employment agency in the city of Malmö were gate openers to reach informants. Analysis was based on constructivist grounded theory, implying an emergent design where data collection and analysis go hand in hand. **Results:** All informants had completed secondary school in Sweden, and one third had studied at the university level. A majority currently had jobs; however, they were mostly employed on an hourly basis and only a few had temporary full-time jobs. The analysis resulted in a core category "Diverting blame to stay sane," which summarized an emergent coping process involving individual resources and resources represented by the individuals' social capital. The developed theoretical model contained four main categories, "Facing reality," "Losing control,"

"Adapting," and "Fighting back," related to the core category. **Conclusions:** The results implied a process where the challenges created by loss of employment-based rights required a coping process where the individual's social capital plays an important role. However, social capital is to a large extent determined by contextual factors, underlining the strong health equity aspect of precarious employment.

Toivanen et al. 2020.

BMC Public Health, vol. 20, no. 1.

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

Keywords: Grounded theory; Mental health; Precarious employment; Qualitative; Social capital; Sweden; Youth

Evidence Level: 5A

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08626-4>

Analysis of occupational stress and its relationship with secretory immunoglobulin a in the Xinjiang Plateau young military recruits

Background: With the continuous improvement of the modernization of the Chinese military and the major adjustments made by the state to the recruitment policy, the newly recruited military undergo multiple pressures such as targeted high-intensity military training and environmental changes. The mental health of military has become a crucial factor of improving the fighting capacity effectiveness of the troops.

Objectives: To explore occupational stress of young recruits in the Xinjiang plateau environment during their basic military training period and analyze the relationship between occupational stress and secretory immunoglobulin A (sIgA) levels. **Methods:** Using multistage stratified cluster random sampling, 625 recruits stationed at Xinjiang plateau command in 2014 were enrolled as subjects. Occupational stress was assessed by the Occupational Stress Inventory Revised Edition (OSI-R). sIgA in saliva was quantified by enzyme-linked immunosorbent assay. The resulting data were analyzed using descriptive statistics, nonparametric tests, and correlation analysis. **Results:** Based on demographic characteristics, occupational stress was higher in the urban group than the rural group, coping ability for stress was greater in individuals who were students before joining the army than nonstudents, occupational stress was higher in smokers than nonsmokers, and coping ability for stress was higher in nonsmokers than in smokers (all $P < 0.05$). Being an only child, educational level and age were not significantly related to occupational stress scores ($P > 0.05$). Salivary sIgA level was higher in the high occupational stress group than in the low stress group ($P < 0.01$). Salivary sIgA was positively correlated with scores on the occupational role and personal strain questionnaires ($r_s = 0.229$, $r_s = 0.268$, $P < 0.01$). **Conclusion:** Demographic characteristics influenced occupational stress among young recruits in cold and high-altitude area. Further, there were some relationships between occupational stress and salivary sIgA in young military recruits.

Tao et al. 2020.

BioMed Research International.

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

Keywords: Occupational stress; Secretory immunoglobulin; Military; Recruits

Evidence Level: 2B

Link: <https://www.hindawi.com/journals/bmri/2020/8695783/>

Burnout

Work-to-family conflict, job burnout, and project success among construction professionals: The moderating role of affective commitment

This study explored the effects of work-to-family conflict on job burnout and project success in the construction industry. First, a theoretical model with affective commitment as a moderating variable was developed according to the conservation of resources theory. A structured questionnaire survey was then performed with Chinese construction professionals, with 309 valid responses received. In the valid data, the proportion of male construction professionals is 73% and that of female construction professionals is 27%. The analysis of the valid data used structural equation modeling. The results indicate that: (i) work-to-family conflict has a positive and significant effect on job burnout, and a negative and significant effect on project success; (ii) job burnout negatively affects project success; (iii) affective commitment negatively

moderates the relationship between work-to-family conflict and job burnout. This study extends the existing body of knowledge on work-to-family conflict and helps us to better understand the functional and moderating roles of affective commitment in the context of construction projects. Furthermore, this study provides theoretical guidance and a decision-making reference to help construction enterprises manage the work-to-family conflict and job burnout of construction professionals and advance their levels of affective commitment.

Cao et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: Affective commitment; Construction professionals; Job burnout; Project success; Structural equation modeling; Work-to-family conflict

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/8/2902>

Enabling Healthy and Safe Workplaces

Health and Wellbeing

Relationships of obesity-related indices and metabolic syndrome with subclinical atherosclerosis in middle-aged untreated Japanese workers

Aim: Obesity is a social problem due to the prevalence of the Western lifestyle. In particular, visceral fat accumulation, which is a main component of metabolic syndrome, is closely associated with the progression of atherosclerosis. This study aimed to investigate the relationships of obesity-related indices and metabolic syndrome with subclinical atherosclerosis in middle-aged untreated workers. **Methods:** Employees undergoing their periodic health check-up but without previous cardiovascular events or cardiovascular medications were enrolled in this study (n=7,750). Body mass index (BMI), percent body fat, waist circumference, and visceral fat area were evaluated as obesity-related indices. Assessment of visceral fat area was performed by computed tomography (CT). Subclinical atherosclerosis was assessed by measuring arterial stiffness using cardio-ankle vascular index (CAVI) and by ultrasound examination of carotid intima-media thickness (IMT). **Results:** Obesity-related indices were significantly correlated with each other and were positively associated with carotid IMT but negatively associated with CAVI in multivariate regression analysis. In a logistic regression analysis including CAVI and carotid IMT simultaneously, CAVI was negatively associated, but carotid IMT was positively associated, with obesity defined by each obesity-related index. In contrast, both CAVI and carotid IMT were positively associated with the presence of metabolic syndrome based on visceral fat accumulation. **Conclusions:** Obesity-related indices were negatively associated with CAVI and positively associated with carotid IMT in middle-aged untreated workers, while both CAVI and carotid IMT were worsened in the presence of metabolic syndrome.

Sugiura et al. 2020.

Journal of Atherosclerosis and Thrombosis, vol. 27, no. 4.

User License: Creative Commons Attribution -NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) (<https://creativecommons.org/licenses/by-nc-sa/4.0/deed.en>)

Keywords: Atherosclerosis; Cardio-ankle vascular index; Carotid intima-media thickness; Metabolic syndrome; Obesity

Evidence Level: 4B

Link: https://www.jstage.jst.go.jp/article/jat/27/4/27_50633/_article

Measuring eudemonic well-being at work: a validation study for the 24-item the University of Tokyo Occupational Mental Health (TOMH) well-being scale among Japanese workers

Although the eudemonic perspective seems to be a promising in considering vocational identity among working population, well-being at work has been discussed primarily in terms of subjective/hedonic well-being. This study aimed to develop a new tool to measure eudemonic well-being at work (The University of Tokyo Occupational Mental Health [TOMH] well-being 24 scale) and investigate its validity in a collectivist

culture. Two online surveys were conducted with a total of 1,760 workers in Japan. We created 89 potential items from existing scales. An exploratory factor analysis indicated eight factors for the dimensions of measurement. After item selection based on item response theory, the factor structure with three items from each of the eight dimensions indicated an excellent fit for another sample. Cronbach's α and intra-class coefficients ranged from 0.671 to 0.845. The scores of the tool were more strongly associated with subjective well-being in the work context rather than well-being in general. In addition, the participants in the group demonstrating a higher risk for mental illness and a more stressful work environment indicated significantly lower scores, even after adjusting for general eudemonic well-being. The new measurement may be useful both for academic and practical applications for measuring eudemonic well-being at work, independent from general eudemonic well-being.

Watanabe et al. 2020.

Industrial Health, vol. 58, no. 2.

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: Eudemonia; Item response theory; Psychometry; Scale development; Workers

Evidence Level: 4B

Link: https://www.jstage.jst.go.jp/article/indhealth/58/2/58_2019-0074/article

Influence of occupational background on smoking prevalence as a health inequality among employees of medium- and small-sized companies in Japan.

Tobacco smoking is a major public health problem. In addition, the influence of socioeconomic status on health inequalities has received great attention worldwide. The authors used insurance data of beneficiaries employed in medium- and small-sized Japanese companies to investigate the influence of occupational background on smoking prevalence as a health inequality among workers in Japan. Participants were aged 35-74 years and underwent health examinations in 2015. Smoking prevalence was estimated for each occupational group according to sex, age, and income. Logistic regression analysis was used to assess the association between smoking status and occupational groups. A total of 385,945 participants were included. Overall smoking prevalence was 36.3%, higher than average in Japan. Smoking prevalence was lowest among workers in the education and learning support category; all other occupational groups had significantly high prevalence, with the highest for transport and postal services (odds ratio 2.69, 95% confidence interval 2.53-2.86). There were few differences in smoking prevalence at higher income levels among female participants, but differences were remarkably significant at lower income levels. For health inequalities related to smoking, occupational background was associated with smoking prevalence. In particular, there was high smoking prevalence in workplaces not covered by smoke-free policies. These results also demonstrated differences between the sexes; smoking prevalence among female workers with lower income levels was strongly associated with occupational background whereas there were no large differences among male workers by income. These findings suggest that the government should encourage companies to adopt smoke-free policies in the workplace.

Fujita et al. 2020.

Population Health Management, vol. 23, no. 2.

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

Keywords: Health inequality; Occupation; Prevalence; Smoking; Workplace

Evidence Level: 5B

Link: <https://www.liebertpub.com/doi/full/10.1089/pop.2019.0021>

What makes a good work break? Off-job and on-job recovery as predictors of employee health

Recovery from work today seems to be crucial for health care employees' health, so it is important to uncover ways to facilitate and improve adequate recovery from work. Focusing on the recovery concept of detachment from work, this study investigated associations between detachment after work and during work breaks and individual health among health care employees from a general hospital in the Netherlands. An online cross-sectional survey study was conducted comprising a sample of 368 health care employees of different departments. Controlling for demographics in hierarchical regression analyses, results showed that when health care employees experienced more cognitive detachment after work, they reported less concentration problems. Second, when employees experienced more emotional detachment

after work, they reported less feelings of emotional exhaustion, less depressive feelings, and less sleep problems. Finally, in case employees experienced more physical detachment after work, they reported less concentration problems, less feelings of emotional exhaustion, less sleep problems and less physical health problems. No significant associations were found for detachment during work breaks. In conclusion, findings add to current recovery research showing that detachment after work is an important predictor for health care employees' health.

Jonge et al. 2020.

Industrial Health, vol. 58, no. 2.

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: Fatigue; Psychosocial stress; Sleep; Work hours; Workload

Evidence Level: 4A

Link: https://www.istage.jst.go.jp/article/indhealth/58/2/58_2019-0097/article

Work Health and Safety

Assessment of thermal exposure level among construction workers in UAE using WBGT, HSI and TWL indices.

The study aimed to assess the heat stress of the construction workers in the United Arab Emirates (UAE), using Wet Bulb Globe temperature (WBGT) index, whereas also computing Heat stress index (HSI), and Thermal Work Limit (TWL) for comparison. Portable Area Heat Stress Monitor (HS-32) was used for measuring WBGT outdoor, Dry Bulb Temperature, Natural Wet Bulb Temperature, Globe Temperature in °C, and Relative humidity. The outcomes demonstrated that the WBGT exceeded the recommended Threshold Limit Value (TLV) and that workers are at risk of heat stress. According to HSI, only fit acclimatized young workers can tolerate work in this site, and workers should be selected by medical examination. As per TWL, the site was labeled as Acclimatization Zone implying that no un-acclimatized worker should work here and working alone should be avoided. The construction workers lie at a high or medium risk of heat stress. The contribution of the radiant heat load was very high compared with metabolic load and convective load. Furthermore, WBGT, HSI, and TWL are suitable to assess thermal stress in construction environments. Scheduling of the work earlier or later (after sunset) along with breaks for rest on cool shaded areas are recommended.

Ahmed et al. 2020.

Industrial Health, vol. 58, no. 2.

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: Construction workers; Heat stress; Heat stress index; Thermal work limit; Wet bulb globe temperature index

Evidence Level: 5B

Link: https://www.istage.jst.go.jp/article/indhealth/58/2/58_2018-0259/article

Estimating the burden of United States workers exposed to infection or disease: A key factor in containing risk of COVID-19 infection

Introduction: With the global spread of COVID-19, there is a compelling public health interest in quantifying who is at increased risk of contracting disease. Occupational characteristics, such as interfacing with the public and being in close quarters with other workers, not only put workers at high risk for disease, but also make them a nexus of disease transmission to the community. This can further be exacerbated through presenteeism, the term used to describe the act of coming to work despite being symptomatic for disease. Quantifying the number of workers who are frequently exposed to infection and disease in the workplace, and understanding which occupational groups they represent, can help to prompt public health risk response and management for COVID-19 in the workplace, and subsequent infectious disease outbreaks. **Methods:** To estimate the number of United States workers frequently exposed to infection and disease in the workplace, national employment data (by Standard Occupational Classification) maintained by the Bureau of Labor Statistics (BLS) was merged with a BLS O*NET survey measure reporting how

frequently workers in each occupation are exposed to infection or disease at work. This allowed us to estimate the number of United States workers, across all occupations, exposed to disease or infection at work more than once a month. **Results:** Based on our analyses, approximately 10% (14.4 M) of United States workers are employed in occupations where exposure to disease or infection occurs at least once per week. Approximately 18.4% (26.7 M) of all United States workers are employed in occupations where exposure to disease or infection occurs at least once per month. While the majority of exposed workers are employed in healthcare sectors, other occupational sectors also have high proportions of exposed workers. These include protective service occupations (e.g. police officers, correctional officers, firefighters), office and administrative support occupations (e.g. couriers and messengers, patient service representatives), education occupations (e.g. preschool and daycare teachers), community and social services occupations (community health workers, social workers, counselors), and even construction and extraction occupations (e.g. plumbers, septic tank installers, elevator repair). **Conclusions:** The large number of persons employed in occupations with frequent exposure to infection and disease underscore the importance of all workplaces developing risk response plans for COVID-19. Given the proportion of the United States workforce exposed to disease or infection at work, this analysis also serves as an important reminder that the workplace is a key locus for public health interventions, which could protect both workers and the communities they serve.

Baker et al. 2020.

PLoS One, vol. 15, no. 4.

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

Keywords: Infection; Disease; COVID-19; Burden; Occupation; Public health

Evidence Level: 5A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232452>

COVID-19 outbreak in Italy: protecting worker health and the response of the Italian industrial hygienists association

The number of people infected with severe acute respiratory syndrome - coronavirus 2 (SARS-CoV-2), i.e. the virus causing coronavirus disease (COVID-19), is dramatically increasing worldwide to the size of a pandemic. At the time of writing Italy is ranking first among countries both in terms of number of COVID-19 confirmed cases and in terms of number of deaths. Such a wide spread of COVID-19 has led to concern among workers who are facing the risk of becoming infected during the execution of their duties. We believe it is useful to remark on the need for professional expertise in the field of Occupational Hygiene in this emergency context, in which the indications provided by national and international bodies, the available scientific literature and the legal provisions are constantly and rapidly evolving. It is of fundamental importance that there is an effective analysis of expert inputs, to provide essential guidance to Health, Safety and Environmental managers and other prevention managers in workplaces. In this regard, not only a constant update of the regulatory framework is needed, but also a development and circulation of operational guidance to all the stakeholders to translate general indications into clear operating procedures and implementation tools to be adopted in the workplaces. We believe that the scientific associations in the field of Occupational Hygiene play a crucial role in guiding and assisting prevention professionals. There is considerable expertise in the occupational hygiene and exposure science communities that can help employers and workers to contain and delay the spread of Covid-19. For this reason, the Italian Association of Industrial Hygienists (AIDII - Associazione Italiana degli Igienisti Industriali) published documents containing operational guidelines to provide correct and constantly updated information for: (1) workers employed in essential activities (with low and medium risk of contagion), (2) health workers and other workers at high or very high risk of contagion, and (3) for the correct use and handling of personal protective equipment (PPE) for workers and for the population in general. It is worth pointing out that the documents produced are not intended to replace those produced by authoritative bodies, but to comply with and complete them by reporting an effective summary and further indications about the measures that should be taken in practice under the light of the Italian legislation. At present, the challenge is to produce scientifically-sound knowledge, appropriate tools and effective methodologies, by coordinating the initiatives of different scientific associations, with the final aim to effectively transfer them to employers and workers.

Spinazze et al. 2020.

Annals of Work and Environmental Health.

Keywords: COVID-19; SARS-CoV-2; Occupational health; Occupational hygiene; Workers' health

Evidence Level: 6B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7184418/>

Leveraging existing cohorts to study health effects of air pollution on cardiometabolic disorders: India global environmental and occupational health hub

Air pollution is a growing public health concern in developing countries and poses a huge epidemiological burden. Despite the growing awareness of ill effects of air pollution, the evidence linking air pollution and health effects is sparse. This requires environmental exposure scientist and public health researchers to work more cohesively to generate evidence on health impacts of air pollution in developing countries for policy advocacy. In the Global Environmental and Occupational Health (GEOHealth) Program, we aim to build exposure assessment model to estimate ambient air pollution exposure at a very fine resolution which can be linked with health outcomes leveraging well-phenotyped cohorts which have information on geolocation of households of study participants. We aim to address how air pollution interacts with meteorological and weather parameters and other aspects of the urban environment, occupational classification, and socioeconomic status, to affect cardiometabolic risk factors and disease outcomes. This will help us generate evidence for cardiovascular health impacts of ambient air pollution in India needed for necessary policy advocacy. The other exploratory aims are to explore mediatory role of the epigenetic mechanisms (DNA methylation) and vitamin D exposure in determining the association between air pollution exposure and cardiovascular health outcomes. Other components of the GEOHealth program include building capacity and strengthening the skills of public health researchers in India through variety of training programs and international collaborations. This will help generate research capacity to address environmental and occupational health research questions in India. The expertise that we bring together in GEOHealth hub are public health, clinical epidemiology, environmental exposure science, statistical modeling, and policy advocacy.

Walia et al. 2020.

Environmental Health Insights.

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

Keywords: Air pollution; India; Cardiovascular diseases; Cohort studies; Particulate matter

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7171984/>

Risk Assessment

Analysis of job-related demands and resources in ambulatory youth welfare services: A qualitative and quantitative approach.

In this study, we investigated health-relevant job characteristics of social workers in ambulatory youth welfare services, combining qualitative and quantitative methods. Based on a systematic literature review, expert workshops, and focus group discussions with 9 experts of the target group, we identified target group-specific job demands and job resources, which we compiled into a questionnaire using content-valid scales. The target group-specific survey tool comprises 9 scales for assessing job demands and 10 scales for assessing job resources. Analyses of data from 209 social workers demonstrated desirable psychometric properties and substantial correlations of the scales with coping behaviours and indicators of employee well-being. The scales for assessing job demands were negatively related to psychological well-being and job satisfaction and positively related to burnout and depressiveness. The scales for assessing job resources showed positive correlations with indicators of positive well-being and negative correlations with indicators of impaired well-being. Regression analyses revealed that job resources explained a higher amount of variance in the positive well-being indicators compared to job demands. The study identified a broad range of health-relevant job characteristics for social workers in ambulatory youth welfare. Applying the target group-specific survey tool allows organisations to derive suitable implications for the design of health promotion programs.

Vincent-Hoper et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: Ambulatory youth welfare; Job demands; Job resources; Questionnaire; Social workers; Validation

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/8/2941>

Job strain as a risk factor for peripheral artery disease: A multi-cohort study.

Background: Job strain is implicated in many atherosclerotic diseases, but its role in peripheral artery disease (PAD) is unclear. We investigated the association of job strain with hospital records of PAD, using individual-level data from 11 prospective cohort studies from Finland, Sweden, Denmark, and the United Kingdom. **Methods and Results:** Job strain (high demands and low control at work) was self-reported at baseline (1985-2008). PAD records were ascertained from national hospitalization data. We used Cox regression to examine the associations of job strain with PAD in each study, and combined the study-specific estimates in random effects meta-analyses. We used τ^2 , I², and subgroup analyses to examine heterogeneity. Of the 139 132 participants with no previous hospitalization with PAD, 32 489 (23.4%) reported job strain at baseline. During 1 718 132 person-years at risk (mean follow-up 12.8 years), 667 individuals had a hospital record of PAD (3.88 per 10 000 person-years). Job strain was associated with a 1.41-fold (95% CI, 1.11-1.80) increased average risk of hospitalization with PAD. The study-specific estimates were moderately heterogeneous ($\tau^2=0.0427$, I²: 26.9%). Despite variation in their magnitude, the estimates were consistent in both sexes, across the socioeconomic hierarchy and by baseline smoking status. Additional adjustment for baseline diabetes mellitus did not change the direction or magnitude of the observed associations. **Conclusions:** Job strain was associated with small but consistent increase in the risk of hospitalization with PAD, with the relative risks on par with those for coronary heart disease and ischemic stroke.

Heikkila et al. 2020.

Journal of the American Heart Association, vol. 5, no. 9.

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: Epidemiology; Job strain; Meta-analysis; Peripheral artery disease; Risk factors

Evidence Level: 4A

Link: <https://www.ahajournals.org/doi/10.1161/JAHA.119.013538>

Occupational Exposure

Airborne or droplet precautions for health workers treating COVID-19?

Cases of COVID-19 have been reported in over 200 countries. Thousands of health workers have been infected and outbreaks have occurred in hospitals, aged care facilities and prisons. World Health Organization (WHO) has issued guidelines for contact and droplet precautions for Healthcare Workers (HCWs) caring for suspected COVID-19 patients, whilst the US Centre for Disease Control (CDC) has recommended airborne precautions. The 1 - 2 m (\approx 3 - 6 ft) rule of spatial separation is central to droplet precautions and assumes large droplets do not travel further than 2 m (\approx 6 ft). We aimed to review the evidence for horizontal distance travelled by droplets and the guidelines issued by the World Health Organization (WHO), US Center for Diseases Control (CDC) and European Centre for Disease Prevention and Control (ECDC) on respiratory protection for COVID-19. We found that the evidence base for current guidelines is sparse, and the available data do not support the 1 - 2 m (\approx 3 - 6 ft) rule of spatial separation. Of ten studies on horizontal droplet distance, eight showed droplets travel more than 2 m (\approx 6 ft), in some cases more than 8 meters (\approx 26 ft). Several studies of SARS-CoV-2 support aerosol transmission and one study documented virus at a distance of 4 meters (\approx 13 ft) from the patient. Moreover, evidence suggests infections cannot neatly be separated into the dichotomy of droplet versus airborne transmission routes. Available studies also show that SARS-CoV-2 can be detected in the air, 3 hours after aerosolisation. The

weight of combined evidence supports airborne precautions for the occupational health and safety of health workers treating patients with COVID-19.

Bahl et al. 2020.

Journal of Infectious Diseases.

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: COVID-19; Coronavirus; Droplet Transmission; Mask; Respiratory Protection; SARS-CoV-2

Evidence Level: 1A

Link: <https://academic.oup.com/jid/advance-article/doi/10.1093/infdis/jiaa189/5820886>

Prevalence of occupational exposure and its influence on job satisfaction among Chinese healthcare workers: a large-sample, cross-sectional study

Objectives: This study had three objectives: (1) describe the prevalence of occupational exposure among Chinese medical personnel in detail, (2) verify the partial mediating role of work environment satisfaction in the relationship between occupational exposure and job satisfaction, and (3) examine if stress symptoms moderate the relationship between occupational exposure and job satisfaction. **Design:** A large cross-sectional online survey was conducted in July 2018 in China. A survey was conducted in 54 cities across 14 provinces of China. A total of 12 784 questionnaires were distributed, and 9924 healthcare workers (HCWs) completed valid questionnaires. The response rate was 77.63%. A confidential questionnaire was distributed to HCWs. The relationships among and the mechanisms of the variables were explored using descriptive statistical analyses, Pearson's correlation coefficient and multiple linear regression analysis.

Results: The most common occupational exposures among HCWs in the past 12 months were psychosocial and organisational hazards (85.93%). Overall, physicians (93.7%) and nurses (89.2%) were the main victims of occupational exposure. Occupational exposure correlated negatively with work environment satisfaction and job satisfaction, and positively with stress symptoms. Moreover, work environment satisfaction fully mediated the relationship between occupational exposure and job satisfaction, and stress symptoms moderated the relationship between occupational exposure and job satisfaction. **Conclusion:** The incidence of occupational exposure among HCWs is generally high. The high frequency of psychosocial and organisational hazards among physicians and nurses should be taken seriously and dealt with in a timely manner by hospital managers. The negative impact of occupational exposure on job satisfaction must be buffered by measures to reduce stress symptoms and enhance working environment satisfaction, ultimately improving the overall quality of life of HCWs and promoting comprehensive development of the medical team.

Shi et al. 2020.

BMJ Open, vol. 10, no. 4.

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

Keywords: Healthcare workers; Job satisfaction; Occupational exposure; Occupational health and safety; stress; Working environment

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/10/4/e031953.long>

Towards a risk evaluation of workers' exposure to handborne and airborne microbial species as exemplified with waste collection workers

Bioaerosol exposure is associated with health problems. The aim of this study is to evaluate whether it is possible to assess the risks posed by waste collection workers' exposure through identification and characterization of bacterial and fungal species, to which the workers are exposed. Using MALDI-TOF MS, microorganisms in waste collection workers' exposure through air, hand, and contact with the steering wheel were identified. Fungi found in high concentrations from the workers' exposure were characterized for the total inflammatory potential (TIP), cytotoxicity, and biofilm-forming capacity. In total, 180 different bacterial and 37 different fungal species in the workers' exposure samples were identified. Some of them belong to Risk Group 2, e.g. *Escherichia coli*, *Klebsiella oxytoca*, *Staphylococcus aureus*, and *Aspergillus fumigatus*, some have been associated with occupational health problems e.g. *Penicillium citrinum* and *P. glabrum* and some are described as emerging pathogens e.g. *Aureobasidium pullulans*. The TIP of fungal species was dose-dependent. High TIP values were found for *Penicillium italicum*, *P. brevicompactum*, *P.*

citrinum, and *P. glabrum*. Several species were cytotoxic, e.g. *A. niger* and *P. expansum*, while some, e.g. *P. chrysogenum*, did not affect the cell viability. Based on waste workers' average inhalation rate, they inhaled up to 2.3×10^4 cfu of *A. niger*, 7.4×10^4 cfu of *P. expansum*, and 4.0×10^6 cfu of *P. italicum* per work day. Some species e.g. *A. niger* and *P. citrinum* were able to form biofilm. In conclusion, the workers were exposed to several species of microorganisms of which some to varying degrees can be evaluated concerning risk. Thus, some microorganisms belong to Risk Group 2, and some are described as causing agents of occupational health problems, emerging pathogens, or intrinsically antibiotic resistant. For some other species very little is known. The TIP, cytotoxicity, and ability to form biofilm of the dominating fungi support and expand previous findings. These parameters depended on the species and the dose, thus highlighting the importance of species identification and exposure level in the risk assessment of exposure.

Madsen et al. 2020.

Environmental Research.

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: Bacterial species; Biofilm; Environmental fungal species; HL-60 cells; Inflammation; MALDI-TOF

Evidence Level: 5A

Link: <https://www.sciencedirect.com/science/article/pii/S0013935120300694?via%3Dihub>

Association of silica dust exposure and cigarette smoking with mortality among mine and pottery workers in China

Importance: The joint association of long-term silica dust exposure and cigarette smoking with mortality has not been well established. **Objective:** To evaluate the joint association of silica dust exposure and cigarette smoking with mortality in a large cohort of workers at mines and factories in China. **Methods:** This cohort study included 44 708 adults who were employed in 20 metal mines and 9 pottery factories in central and southern China for at least 1 year between January 1, 1960, and December 31, 1974. Participants were retrospectively followed up to January 1, 1960, and prospectively followed up to December 31, 2003. Data analysis was conducted from April 5, 2019, to October 26, 2019. **Exposures:** Cumulative respirable silica dust exposure was estimated by linking a job-exposure matrix to participants' personal work histories. Cigarette smoking data were collected through participant questionnaires. **Outcomes:** The main outcome was mortality, with codes from the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) used to categorize diseases associated with mortality. **Results:** Among 44 708 participants, 38 221 (85.49%) were men, with a mean (SD) age at cohort entrance of 26.9 (8.1) years. A total of 13 700 deaths were observed during 1 534 005 person-years of follow-up, with a median follow-up period of 34.9 years (range, 4.8-43.9 years). Silica exposure was associated with a higher risk of mortality among individuals with all diseases, lung cancer, respiratory tuberculosis, cardiovascular diseases, and diseases of the respiratory system; cigarette smoking was associated with an increased risk of mortality among individuals with all diseases, lung cancer, respiratory tuberculosis, cerebrovascular diseases, and diseases of the respiratory tract. The hazard ratios for the joint association of silica dust exposure and cigarette smoking with mortality were 4.51 (95% CI, 3.23-6.29) for lung cancer, 3.21 (95% CI, 2.53-4.08) for certain infectious and parasitic diseases, 3.93 (95% CI, 2.99-5.15) for respiratory tuberculosis, 6.27 (95% CI, 4.83-8.15) for diseases of the respiratory system, and 12.52 (95% CI, 7.92-19.80) for pneumoconiosis, with a significant additive interaction ($P < .001$). The proportions of the joint association for the additive interaction of silica dust exposure and cigarette smoking were 21.63% for lung cancer, 42.12% for certain infectious and parasitic diseases, 42.25% for respiratory tuberculosis, 29.55% for diseases of the respiratory system, and 36.46% for pneumoconiosis. **Conclusions:** These findings suggest that cigarette smoking is associated with an increased risk of mortality in individuals exposed to silica. Smoking cessation and the control of silica dust concentrations may be important for reducing the risk of mortality among individuals exposed to silica.

Wang et al. 2020.

JAMA Network Open, vol. 3, no. 4.

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: Occupational exposure; Silica dust; Cigarette smoke; Mortality; Mine workers; Pottery workers

Evidence Level: 5B

Link: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2764378>

Occupational hazards and risks associated with phthalates among Slovakian firefighters.

Despite increasing attention to the occupational risk of firefighters, little is known about phthalate exposure. In our study, we detected mono-isobutyl phthalate (MiBP), mono-n-butyl phthalate (MnBP), mono(2-ethyl-5-hydroxyhexyl) phthalate (5OH-MEHP), mono(2-ethyl-5-carboxypentyl) phthalate (5cx-MECP), and mono(2-ethyl-5-oxohexyl) phthalate (5oxo-MEHP) in each urine sample. We detected positive association between MnBP, MiBP, mono-2-ethylhexyl phthalate (MEHP), 5OH-MEHP, 5oxo-MEHP, 5cx-MECP, mono-isononyl phthalate (MiNP), the sum of low (Σ LMWP) and high molecular-weight phthalates (Σ HMWP), and Tiffeneau-Pinelli index (the ratio of forced expiratory volume in 1/ forced vital capacity; FEV1/FVC; $p = 0.001-0.04$) and the percent predicted value (%PV) of FEV1/FVC ($p = 0.005-0.05$) and negative association between MiNP and peak expiratory flow (PEF; $r = -0.31$; $p = 0.084$). We observed a positive association between phthalate metabolites (MnBP, 5OH-MEHP, 5oxo-MEHP, 5cx-MECP, 2cx-MMHP, Σ LMWP, and Σ HMWP) and waist-to-hip ratio (WHR; $p = 0.003-0.09$) and body shape index (ABSI; $p = 0.039-0.09$) and a negative association between MnBP, Σ LMWP, and hip circumference ($p = 0.005-0.02$). We detected association between concentrations of 5OH-MEHP, 5cx-MECP, 5oxo-MEHP, and MnBP and consumption of food heating in plastic material in microwave ($p = 0.02-0.04$) and between probands who ate margarines and vegetable fat packed in plastic containers and concentration of MMP ($p = 0.03$). Results of multivariate regression indicated that exposure to phthalates could be linked with changing body structure, which subsequently affects values of pulmonary functions in firefighters.

Kolena et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Biomonitoring; Firefighters; Health; Occupational; Phthalate exposure

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/7/2483>

Transcriptomic changes in the nasal epithelium associated with diesel engine exhaust exposure.

Background: Diesel engine exhaust (DEE) exposure causes lung cancer, but the molecular mechanisms by which this occurs are not well understood. Objectives: To assess transcriptomic alterations in nasal epithelium of DEE-exposed factory workers to better understand the cellular and molecular effects of DEE. Methods: Nasal epithelial brushings were obtained from 41 diesel engine factory workers exposed to relatively high levels of DEE (17.2-105.4 $\mu\text{g}/\text{m}^3$), and 38 unexposed workers from factories without DEE exposure. mRNA was profiled for gene expression using Affymetrix microarrays. Linear modeling was used to identify differentially expressed genes associated with DEE exposure and interaction effects with current smoking status. Pathway enrichment among differentially expressed genes was assessed using EnrichR. Gene Set Enrichment Analysis (GSEA) was used to compare gene expression patterns between datasets. Results: 225 genes had expression associated with DEE exposure after adjusting for smoking status (FDR $q < 0.25$) and were enriched for genes in pathways related to oxidative stress response, cell cycle pathways such as MAPK/ERK, protein modification, and transmembrane transport. Genes up-regulated in DEE-exposed individuals were enriched among the genes most up-regulated by cigarette smoking in a previously reported bronchial airway smoking dataset. We also found that the DEE signature was enriched among the genes most altered in two previous studies of the effects of acute DEE on PBMC gene expression. An exposure-response relationship was demonstrated between air levels of elemental carbon and the first principal component of the DEE signature. Conclusions: A gene expression signature was identified for workers occupationally exposed to DEE that was altered in an exposure-dependent manner and had some overlap with the effects of smoking and the effects of acute DEE exposure. This is the first study of gene expression in nasal epithelial cells of workers heavily exposed to DEE and provides new insights into the molecular alterations that occur with DEE exposure.

Drizik et al. 2020.

Environment International.

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

Keywords: Diesel engine exhaust; Lung cancer; Microarray; Occupational exposure

Evidence Level: 4A

Link: <https://www.sciencedirect.com/science/article/pii/S0160412019330272?via%3Dihub>

Asbestosis and Mesothelioma

Chromatographic detection of 8-Hydroxy-2'-Deoxyguanosine in leukocytes of asbestos exposed workers for assessing past and recent carcinogen exposures

Asbestos fibers include a group of silicate minerals that occur in the environment and are widely employed in occupational settings. Asbestos exposure has been associated to various chronic diseases; such as pulmonary fibrosis; mesothelioma; and lung cancer; often characterized by a long period of latency. Underlying mechanisms that are behind the carcinogenic effect of asbestos have not been fully clarified. Therefore; we have conducted an epidemiological study to evaluate the relationship between 8-hydroxy-2'-deoxyguanosine (8-oxodG), one of the most reliable biomarkers of oxidative stress and oxidative DNA damage; and asbestos exposure in the peripheral blood of residents in Tuscany and Liguria regions; Italy; stratified by occupational exposure to this carcinogen. Levels of 8-oxodG were expressed such as relative adduct labeling (RAL); the frequency of 8-oxodG per 105 deoxyguanosine was significantly higher among exposed workers with respect to the controls; i.e., 3.0 ± 0.2 Standard Error (SE) in asbestos workers versus a value of 1.3 ± 0.1 (SE) in unexposed controls ($p < 0.001$). When the relationship with occupational history was investigated; significant higher levels of 8-oxodG were measured in current and former asbestos workers vs. healthy controls; 3.1 ± 0.3 (SE) and 2.9 ± 0.2 (SE), respectively. After stratification for occupational history; a significant 194% excess of adducts was found in workers with 10 or more years of past asbestos exposure ($p < 0.001$). 8-oxodG can be used for medical surveillance programs of cohorts of workers with past and recent exposures to carcinogens for the identification of subjects requiring a more intense clinical surveillance.

Cellai et al. 2020.

Diagnostics, vol. 10, no. 4.

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

Keywords: 8-oxodG; Asbestos; Leukocytes

Evidence Level: 4B

Link: <https://www.mdpi.com/2075-4418/10/4/239>

Sedentary Practices

Effects of a workplace-based virtual-run intervention among university employees.

Virtual runs (real running or walking activities using online recording platforms) have been popular in the digital age and could have the potential to promote physical activity (PA) in workplaces. We investigated the effects of a virtual-run intervention (VRI) on PA and body compositions among university employees. A three-phase intervention was conducted over 6 months: 0 (pre-intervention), 1 (during intervention), and 2 (post-intervention). Exercise stages of change were assessed in phases 0 and 2. Body compositions (body weight, body mass index, fat mass, percentage of fat mass, fat-free mass, and percentage of fat-free mass) were assessed in phases 0, 1, and 2. Running and walking times were recorded through a mobile application. Forty-seven participants completed the VRI. The number of participants at the maintenance stage increased from 34.04% in phase 0 ($n = 16$) to 63.83% in phase 2 ($n = 30$). None of the changes in body compositions were significant ($p > 0.05$). The median running and walking time among participants at the maintenance stage was 151.85 (interquartile range, 109.15) min/week. Future research should focus on approaches to improve the efficacy of VRIs and their effects on health outcomes.

Wattanapisit et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 8.

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

Keywords: Physical activity; Running; Virtual run; Walking; Workplace

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/8/2745>

Is type of work associated with physical activity and sedentary behaviour in women with fibromyalgia? A cross-sectional study from the al-Ándalus project.

Objectives: To analyse the association between the type of work (productive vs reproductive work) and the levels of physical activity and sedentary behaviour in women with fibromyalgia. **Methods:** This cross-sectional study involved 258 women with fibromyalgia from southern Spain. Of them, 55% performed reproductive work (unpaid, associated with caregiving and domestic roles) exclusively, while 45% had productive job (remunerated, that results in goods or services). Physical activity of light, moderate and vigorous intensity in the leisure time, at home, at work, and totally were measured through the leisure time physical activity instrument and with the physical activity at home and work instrument, respectively. Sedentary behaviour was measured by the Sedentary Behaviour Questionnaire. **Results:** After adjusting for age, fat percentage, education level and marital status, the multivariate analysis of covariance model informed the existence of significant differences between type of work groups ($p < 0.001$). Women with productive work engaged in more light physical activity at work (mean difference = 448.52 min; 95 % CI 179.66 to 717.38; $p = 0.001$), and total physical activity of light (809.72 min; 535.91 to 1085.53; $p < 0.001$) and moderate (299.78 min; 97.31 to 502.25; $p = 0.004$) intensity. Women with reproductive work engaged in more light physical activity at home (379.14; 175.64 to 582.64; $p < 0.001$). Leisure time physical activity and sedentary behaviour were similar in both groups ($p > 0.05$ for all comparisons). **Conclusions:** Women with productive work had greater levels of physical activity compared with those who only did reproductive work, except for physical activity at home. Having productive work might facilitate movement of women with fibromyalgia towards a more active lifestyle.

Girela-Rejon et al. 2020.

BMJ Open, vol. 10, no. 4.

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

Keywords: Pain management; Rheumatology; Sports medicine

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/10/4/e034697.long>

Physical Activity

Physical activity in paid work time for desk-based employees: a qualitative study of employers' and employees' perspectives

Background: Poor physical and mental health of employees create significant problems in the workplace. Physical activity (PA) has been shown as an effective strategy for preventing and treating numerous physical and mental health issues as well as work performance outcomes. However, there are many barriers to taking part in PA (such as lack of time) with participation rates typically low. Providing PA in paid work time might be a way to overcome these issues, yet employers' and employees' opinions of this concept are unknown. The aim of this study was to explore employee and employer perspectives of PA in paid work time. **Methods:** Workplaces were recruited through existing contacts on the research team. Focus groups and interviews were conducted with employees and managers at one University and two executive non-departmental public bodies in central Scotland with mainly desk-based employees. Both managers and employees were involved to gain perspectives throughout the organisational hierarchy and were interviewed separately to reduce social desirability bias. All discussions were digitally recorded and transcribed verbatim. Data were analysed thematically for both managers and employees but due to significant overlap in themes between the groups, these are reported together in the results. **Results:** Three out of five organisations approached took part in this qualitative study. Two individual interviews were held with strategic managers, five focus groups with middle managers ($n = 16$) and nine with employees ($n = 45$). Benefits were anticipated by managers and employees for both employees themselves and the organisation and included improved mental health, productivity and more favourable perceptions of the employer. Despite these widely acknowledged benefits, significant barriers were identified and included the structure and nature of the working day (high workload, front line job requirements), workplace culture and norms (resentment from colleagues, no break culture) and organisational concerns (cost of lost time, public perceptions). **Conclusions:** This study suggests that there are significant barriers to

PA in paid work time. Whilst numerous anticipated benefits were conveyed by both employees and managers, PA in paid work time is unlikely to become common place until changes in attitudes and the culture towards movement at work occur.

Ryde et al. 2020.

BMC Public Health, vol. 20, no. 1.

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

Keywords: Paid work time; Physical activity; Qualitative; Workplace

Evidence Level: 5A

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08580-1>

Manual Handling

Characterizing human box-lifting behavior using wearable inertial motion sensors.

Although several studies have used wearable sensors to analyze human lifting, this has generally only been done in a limited manner. In this proof-of-concept study, we investigate multiple aspects of offline lift characterization using wearable inertial measurement sensors: detecting the start and end of the lift and classifying the vertical movement of the object, the posture used, the weight of the object, and the asymmetry involved. In addition, the lift duration, horizontal distance from the lifter to the object, the vertical displacement of the object, and the asymmetric angle are computed as lift parameters. Twenty-four healthy participants performed two repetitions of 30 different main lifts each while wearing a commercial inertial measurement system. The data from these trials were used to develop, train, and evaluate the lift characterization algorithms presented. The lift detection algorithm had a start time error of $0.10\text{ s} \pm 0.21\text{ s}$ and an end time error of $0.36\text{ s} \pm 0.27\text{ s}$ across all 1489 lift trials with no missed lifts. For posture, asymmetry, vertical movement, and weight, our classifiers achieved accuracies of 96.8%, 98.3%, 97.3%, and 64.2%, respectively, for automatically detected lifts. The vertical height and displacement estimates were, on average, within 25 cm of the reference values. The horizontal distances measured for some lifts were quite different than expected (up to 14.5 cm), but were very consistent. Estimated asymmetry angles were similarly precise. In the future, these proof-of-concept offline algorithms can be expanded and improved to work in real-time. This would enable their use in applications such as real-time health monitoring and feedback for assistive devices.

Hiucny et al. 2020.

Sensors, vol. 20, no. 8.

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

Keywords: IMU; Analysis; Characterization; Classification; Human motion; Lift; Wearable sensors

Evidence Level: 5A

Link: <https://www.mdpi.com/1424-8220/20/8/2323>

Musculoskeletal Health

Acute and long-term costs of 268 peripheral nerve injuries in the upper extremity.

Background: Peripheral nerve injury in the upper extremity is linked to high socioeconomic burden, yet cost-analyses are rare and from small cohorts. The objective of this study was to determine the costs and long-term socioeconomic effects of peripheral nerve injuries in the upper extremity in Germany. **Methods:** We analyzed data of 250 patients with 268 work-related upper extremity nerve injuries from acute treatment to long-term follow-up on rehabilitation, sick-leave and disability-pension. **Results:** Patients were on average 39.9 ± 14.2 years old, male (85%) and mean inpatient treatment was 7 ± 6 days. Location of nerve was 8% (N = 19) proximal to the wrist, 26% (N = 65) at the wrist and metacarpus, and 66% (N = 166) at phalangeal level. Acute in-patient treatment for (single) median nerve injury accounted for 66% with hospital reimbursement of 3.570€, ulnar nerve injury for 24% and 2.650€ and radial nerve injury for 10% and 3.166€, all including finger nerve injuries. The remaining were combined nerve injuries, with significantly higher costs, especially if combined with tendon 5.086€ or vascular injury 4.886€. Based on location, nerve injuries proximal to the wrist averaged 5.360 ± 6.429 €, at the wrist and metacarpus 3.534 ± 2.710 € and at the phalangeal level 3.418 ± 3.330 €. 16% required rehabilitation with average costs of

5.842€ and stay of 41±21 days. Sick leave was between 11-1109 days with an average of 147 days with socioeconomic costs of 197€/day, equaling on average 17.640€. 30% received a mean yearly disability pension of 3.187€, that would account to 102.167€ per lifetime. **Conclusion:** This large German patient sample indicates that nerve injury has a major impact on function and employment, resulting in significant health care costs. Both proximal and distal nerve injuries led to long-term disability, subsequent sick-leave and in 30% to permanent disability pension. These data are determined to support future studies and health economical work on prevention, treatment and rehabilitation of these often-small injuries with great consequences.

Bergmeister et al. 2020.

PLoS One, vol. 15, no. 4.

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

Keywords: Peripheral nerve injury; Cost; Acute; Long term; Upper extremity

Evidence Level: 4A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0229530>

Cross-sectional survey of musculoskeletal disorders in workers practicing traditional methods of underground coal mining.

Background: In subcontinental underground mines, coal mining is carried out manually and requires many laborers to practice traditional means of coal excavation. Each task of this occupation disturbs workers' musculoskeletal order. In order to propose and practice possible ergonomic interventions, it is necessary to know what tasks (drilling and blasting, coal cutting, dumping, transporting, timbering and supporting, loading and unloading) cause disorder in either upper limbs, lower limbs, or both. **Methods:** To this end, R-programming, version R 3.1.2 and SPSS, software 20, were used to calculate data obtained by studying 260 workers (working at different tasks of coal mining) from 20 mines of four districts of Punjab, Pakistan. In addition, a Standard Nordic Musculoskeletal Questionnaire (SNMQ) and Rapid Upper Limb Assessment (RULA) sheet were used to collect data and to analyze postures respectively. **Results:** In multi regression models, significance of the five tasks for upper and lower limb disorder is 0.00, which means that task based prevalence of upper and lower limb disorders are common in underground coal mines. The results of the multiple bar chart showed that 96 coal cutters got upper limb disorders and 82 got lower limb disorders. The task of timbering and supporting was shown to be dangerous for the lower limbs and relatively less dangerous for the upper limbs, with 25 workers reporting pain in their lower limbs, and 19 workers reporting pain in their upper limbs. Documented on the RULA sheet, all tasks got the maximum possible score (7), meaning that each of these tasks pose a threat to the posture of 100% of workers. The majority of participants (182) fell in the age group of 26 to 35 years. Of those workers, 131 reported pain in the lower limbs and slight discomfort (128) in the upper limbs. The significance value of age was 0.00 for upper limb disorder and was 0.012 for lower limb disorder. Frequency graphs show age in direct proportion to severity of pain while in inverse proportion with number of repetitions performed per min. **Conclusions:** All findings infer that each task of underground coal mining inflicts different levels of disorder in a workers' musculoskeletal structure of the upper and lower limbs. It highlighted the need for urgent intervention in postural aspects of each task.

Ijaz et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 7.

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

Keywords: Coal mine; RULA; Discomfort; Lower limb; Task-based prevalence of pain; Upper limb

Evidence Level: 4a

Link: <https://www.mdpi.com/1660-4601/17/7/2566>