Australian Government
Comcare

Emerging Evidence Alert July 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 June 2020 only.

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Lessons for a COVID-safe transition

Transitioning back to usual workplaces during COVID-19 is a significant challenge for many organisations. For example, many employers are introducing a range of new health and safety policies and procedures around cleaning, good hygiene and physical distancing.

As employers begin to make this transition in Australia and around the world, are there lessons that can be applied from return to work and occupational rehabilitation to further protect and support workers?

According to a recent review published in the Journal of Occupational Rehabilitation, some of the current challenges and issues facing workplaces mirror the same experiences of workers returning to work following an injury or illness.

The review examined existing return to work and occupational rehabilitation literature to understand the similarities with the current circumstances. The review highlighted the following themes for employers to consider:

- individual worker circumstances;
- the need for job flexibility and modification;
- industry and occupation specific considerations;
- psychological and social factors; and
- the needs of disadvantaged workers.

Employers should consider the complexity of these factors for their workers' transition back to usual workplaces. The research recommends that:

- employers have flexible plans and strategies that adapt to individual worker circumstances;
- health and safety guidelines are specific to the workplace and industry; and
- priority is given to vulnerable and disadvantaged workers.

Comcare guidance: Transition back to usual workplaces

As many governments ease COVID-19 restrictions, employers should start preparing workers for a safe, phased return to their usual workplaces. Organisations starting to plan the transition can find out how to maintain a COVID-safe workplace via the Comcare website.

The wearing of face coverings, including face masks, will be mandatory for Victorian workers from 11.59pm on Sunday 2 August. Many other Australians are also opting to wear face masks as further protection. The latest guidance provided by the World Health Organisation suggests the widespread use of face masks may minimise transmission in situations, including work environments, where physical distancing cannot be achieved or where community transmission is high.

For industry specific information to support COVID-Safe transition planning visit the Safe Work Australia website and for further information about the use of face coverings, including face masks visit the Victorian Government website.

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

Using intervention mapping to develop an occupational advice intervention to aid return to work following hip and knee replacement in the United Kingdom

Background: There are increasing numbers of total hip replacements (THR) and total knee replacements (TKR) being performed in patients of working age. Providing patients undergoing TKR and THR with return to work advice might facilitate return to work. The aim of this paper is to report on the process used to systematically develop an occupational advice intervention to be delivered in hospital for those undergoing arthroplasty. **Methods:** The six-step Intervention Mapping (IM) approach to development, implementation and evaluation of a theory and evidence-based interventions was followed. This paper reports on the development of the intervention covered by steps 1 to 4 of the IM process. Steps 1-3 gathered data on current practice and barriers to change using a mixed methods approach (cohort study of patients undergoing THR or TKR, stakeholder interviews, survey of practice, evidence synthesis) and provided a theoretical framework for intervention development. Step 4 used information from steps 1-3 in combination with a Delphi consensus process to develop the intervention and the associated tools and materials to facilitate its delivery. **Results:** The final intervention identified included a number of core principles including: early patient identification; delivery of key information to patients and their employers; assessment and support by a member of the orthopaedic team; procedures for escalation based on patient need; mechanisms to support communication; and training and support for the clinical teams delivering care. A total of 13 patient and 20 staff performance objectives as delivery requirements, were supported by a range of tools, roles and training resources. The intervention addressed outcomes based at the individual and interpersonal levels of the ecological model. **Conclusions:** Following the IM approach resulted in a structured and justified occupational intervention for delivery in secondary care for patients undergoing total hip and knee replacement. The feasibility of the intervention will subsequently be tested alongside further investigation to establish its effectiveness and cost-effectiveness.

Coole et al. 2020.
BMC Health Services Research, vol. 20, no. 1.

Keywords: Arthroplasty; hip; intervention mapping; knee; occupational advice; return to work
Evidence Level: 6A
Link: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-05375-3

The cumulative disadvantage of unemployment: Longitudinal evidence across gender and age at first unemployment in Germany

Unemployment is an important predictor of one's future employment success. Yet, much about the endurance of unemployment effects on workers' careers remains poorly understood. Our study complements this knowledge gap by examining the rate of recovery in the quality of careers following an unemployment spell among a representative sample of previously unemployed workers with different socio-demographic characteristics in Germany. We apply a new dynamic measure that quantifies the quality of binary sequences, distinguishing between "good" (i.e., employment) from "bad" labor force status activities (i.e., unemployment and inactivity). We use longitudinal data from the German Socio-Economic Panel (GSOEP) before the Great Financial Recession over the period 1984-2005 and deploy a series of hybrid models that control for unobserved heterogeneity. We find a non-linear recovery process after unemployment across gender and age groups. That is, after a period of recovery, career quality worsens. Least impacted are men experiencing unemployment when aged between 25-34 years, while men 55-66 have rather stable, though stronger, penalties. Furthermore, we find that recovery processes are contingent upon when respondents experience unemployment.

Manzoni et al. 2020.
PloS One, vol. 15, no. 6.

Keywords: Unemployment; gender; age; employment success; career
Evidence Level: 4B

Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234786

Health-related quality of life and associated factors in patients with myocardial infarction after returning to work: a cross-sectional study

Background: Return to work following myocardial infarction (MI) represents an important indicator of recovery. However, MI can cause patients to feel pressure, loneliness and inferiority during work and even detachment from employment after returning to work, which may affect their quality of life. The aims of this study were to identify the influencing factors of Health-related quality of life (HRQoL) in patients with MI after returning to work and explore the correlations between these factors and HRQoL. **Method:** This was a cross-sectional study. All participants were recruited from tertiary hospitals in China from October 2017 to March 2018. The general data questionnaire, Short-Form Health Survey-8 (SF-8), Health Promoting Lifestyle ProfileII (HPLPII), Medical Coping Modes Questionnaire (MCMQ) and Social Supporting Rating Scale (SSRS) were used to assess 326 patients with myocardial infarction returned to work after discharge. Multiple linear regression analysis was performed to explore factors related to HRQoL in patients with MI after returning to work. **Results:** The sample consisted of 326 patients. The mean total score of quality of life was 28.03 ± 2.554. According to the multiple linear regression analysis, next factors were associated with better HRQoL: younger age (B = - 0.354, P = 0.039), higher income (B = 0.513, P = 0.000), less co-morbidity (B = - 0.440, P = 0.000), the longer time taken to return to work (B = 0.235, P = 0.003), fewer stents installed (B = - 0.359, P = 0.003), participation in cardiac rehabilitation (CR) (B = - 1.777, P = 0.000), complete CR (B = - 1.409, P = 0.000), better health behaviors such as more health responsibility (B = 0.172, P = 0.000) and exercise (B = 0.165, P = 0.000), better nutrition (B = 0.178, P = 0.000) and self-realization (B = 0.165, P = 0.000), stress response (B = 0.172, P = 0.000), more social support such as more objective support (B = 0.175, P = 0.000), subjective support (B = 0.167, P = 0.000) and better utilization of social support (B = 0.189, P = 0.028), positive copping strategies such as more coping (B = 0.133, P = 0.000) and less yield (B = - 0.165, P = 0.000). **Conclusions:** HRQoL of MI patients after returning to work is not satisfactory. Health behavior, coping strategies, social support are factors which can affect HRQoL. A comprehensive and targeted guide may be a way to improve HRQoL and to assist patients' successful return to society.

Du et al. 2020.
Health and Quality of Life Outcomes, vol. 18, no. 1.

Keywords: Factors; health-related quality of life; myocardial infarction; nursing; return to work
Evidence Level: 4A
Link: https://hqlo.biomedcentral.com/articles/10.1186/s12955-020-01447-4

Presenteeism and Absenteeism

Is work group social capital associated with sickness absence? A study of workplace registered sickness absence at the work group level

Background: The concept of social capital has its focus on cooperative relations in the workplace. This study investigates the association between social capital and sickness absence among workers in 41 work groups in the Danish dairy industry and examines the possible effects of an intervention on social capital in the workplace on sickness absence. **Methods:** A sample of 791 dairy workers working in 41 work groups that participated in an intervention study on social capital filled in a questionnaire on four subtypes of social capital, and social capital scores from individual participants were aggregated to the level of work groups. Sickness absence was measured at the level of work groups in company registers as the two-year average percentage of working time lost to sickness absence. Group-level associations between social capital and sickness absence were analyzed using multilevel linear regression analysis. Analyses were adjusted for age, gender, group size, and random effects at the workplace level. **Results:** We found statistically significant associations between social capital within work groups, social capital in relation to the immediate manager, and social capital toward the workplace as a whole on the one side and sickness absence on the other side. We found no support for any effects of the intervention on sickness absence. **Conclusion:** The work group level of social capital is associated with the work group level of sickness

absence. However, the intervention to enhance group-level social capital had no effect on reducing sickness absence in the intervention group.
Clausen et al. 2020.
Safety and Health at Work, vol. 11, no. 2.

Keywords: Absenteeism; intervention study; job resources; longitudinal study; psychosocial work environment
Evidence Level: 4A
Link: https://www.sciencedirect.com/science/article/pii/S2093791120302675?via%3Dihub

Occupational and non-occupational risk factors of sickness absence due to a shoulder lesion
Objectives: To determine the associations of lifestyle factors and cumulative physical workload exposures with sickness absence (SA) due to a shoulder lesion and to calculate their population attributable fractions (PAF). **Methods:** Our nationally representative cohort consisted of 4344 individuals aged 30-62 years who participated in the Finnish Health 2000 Survey. Education, smoking, chronic diseases and work exposures were assessed during interviews and leisure time physical activity with a questionnaire. Weight and height were measured. We followed the individuals for 15 years for the first SA due to a shoulder lesion. We used competing risk regression models. We calculated PAFs to assess the proportion of SA that was attributed to modifiable risk factors. **Results:** In the entire study population, risk factors of SA were age, daily smoking, being exposed for more than 10 years to physically heavy work and being exposed for more than 10 years to at least two specific physical workload factors. The overall PAF for the modifiable risk factors was 49%. In men, number of specific cumulative exposures, obesity and daily smoking predicted SA with PAF values of 34%, 30% and 14%, respectively. Among women, being exposed for more than 10 years to physically heavy work, number of specific cumulative exposures and daily smoking accounted for 23%, 22% and 15% of SA, respectively. **Conclusions:** Reducing significantly prolonged exposure to physical workload factors, avoiding regular smoking in both genders and obesity in men has a high potential to prevent SA due to a shoulder lesion.
Siren et al. 2020.
Occupational and Environmental Medicine, vol. 77, no. 6.

Keywords: OH services; epidemiology; musculoskeletal; sickness absence; workload
Evidence Level: 4A
Link: https://oem.bmj.com/content/77/6/393.long

Is educational level linked to unable to work due to ill-health?
Background: This study aimed to examine the association between educational level and unable to work due to ill-health (UWdIH) among 30- to 79-year-old South Koreans. **Methods:** A cross-sectional nationwide survey of the 2010-2016 Korea National Health and Nutritional Evaluation Survey was used for analyses. A total of 29,930 participants aged ≥30 and < 80 years, who do not have any disability in their daily life because of health problems, were included. Educational level and reason for nonworking are self-reported with multiple choices. Multivariate logistic regression was used to examine an association between education level and UWdIH by setting those who graduated college as their final education (n = 6,997) as a baseline while controlling for potential confounding factors. **Results:** In the age-stratified result, the ratio of UWdIH was increased as age increases in 3 educational groups ($p < .0001$). There was a tendency that low-level educated [International Standard Classification of Education (0-2)] participants showed higher ratio of UWdIH than high-level educated [International Standard Classification of Education (5≤)] participants in both sexes (odds ratio: 2.54, 95% confidence interval: 2.12-3.05). **Conclusion:** There is a clear link between educational level and UWdIH; the less the educated, the more likely to be UWdIH. Policy priority should be given to plans that can help this vulnerable social group to work and enjoy healthy lives.
Jung et al. 2020.
Safety and Work at Health, vol. 11, no. 2.

Keywords: Disability; education; health inequalities; workplace
Evidence Level: 4B
Link: https://www.sciencedirect.com/science/article/pii/S2093791119302604?via%3Dihub

Impact of migraine on workplace productivity and monetary loss: a study of employees in banking sector in Malaysia

Background/objective: Productivity and monetary loss due to migraine in the workplace may be substantial. This study aimed to determine the impact of migraine on productivity and monetary lost among employees in the banking sectors, in a multiethnic middle income country. **Methods:** A cross-sectional online survey was conducted among employees in two multinational banks in Malaysia between April and July 2019. Screening for migraine was conducted using the self-administered ID-Migraine™ questionnaire. Migraine-related disability (MIDAS) and headache frequency were recorded. Impact of migraine on work productivity and activities were evaluated using the Work Productivity and Activity Impairment (WPAI) questionnaire. **Results:** Of the 1268 employees who submitted complete responses, 47.2% (n = 598) were screened positive for migraine. Strikingly, the mean percent productivity loss at work (presenteeism) was almost 20-fold higher than the mean percent work time missed due to migraine (absenteeism) (39.1% versus 1.9%). The mean percent productivity loss in regular activity (activity impairment) and overall work productivity loss (work impairment) was 38.4% and 39.9%, respectively. It was also found that the costs related to presenteeism (MYR 5392.6) (US$1296) was 3.5-fold higher than absenteeism (MYR1,548.3) (US$370). Highest monetary loss related to presenteeism was reported in migraineurs with frequency of headache of above 3 days (MYR 25,691.2) (US$6176), whereas highest monetary loss related to absenteeism was reported in migraineurs with MIDAS grade IV (MYR 12,369.1) (US$2973). Only 30% of migraineurs of MIDAS grade IV reported taking prescribed medication. Notably, a vast majority (96%) of migraineurs who had three or lower episodes of migraine per month did not seek treatment. **Conclusion:** The significant impact of migraine on work productivity and regular activity, appears to lead to substantial monetary loss attributed to not only absenteeism, but more importantly to presenteeism. This study also highlights the unmet needs in migraine management among employees in the banking sector.

Wong et al. 2020.
Journal of Headache Pain, vol. 21, no. 1.
User License:
Keywords: Absenteeism; MIDAS; migraine; presenteeism; WPAI; work productivity
Evidence Level: 4B
Link: https://thejournalofheadacheandpain.biomedcentral.com/articles/10.1186/s10194-020-01144-z

Working Hours

The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury

Background: The World Health Organization (WHO) and the International Labour Organization (ILO) are developing joint estimates of the work-related burden of disease and injury (WHO/ILO Joint Estimates), with contributions from a large network of individual experts. Evidence from mechanistic data and prior studies suggests that exposure to long working hours may cause stroke. In this paper, we present a systematic review and meta-analysis of parameters for estimating the number of deaths and disability-adjusted life years from stroke that are attributable to exposure to long working hours, for the development of the WHO/ILO Joint Estimates. **Objectives:** We aimed to systematically review and meta-analyse estimates of the effect of exposure to long working hours (three categories: 41-48, 49-54 and ≥55 h/week), compared with exposure to standard working hours (35-40 h/week), on stroke (three outcomes: prevalence, incidence, and mortality). **Data sources:** A protocol was developed and published, applying the Navigation Guide to systematic reviews as an organizing framework where feasible. We searched electronic databases for potentially relevant records from published and unpublished studies, including Ovid

MEDLINE, PubMed, EMBASE, Scopus, Web of Science, CISDOC, PsycINFO, and WHO ICTRP. We also searched grey literature databases, Internet search engines, and organizational websites; hand-searched reference lists of previous systematic reviews; and consulted additional experts. **Study eligibility and criteria:** We included working-age (≥15 years) individuals in the formal and informal economy in any WHO and/or ILO Member State but excluded children (aged < 15 years) and unpaid domestic workers. We included randomized controlled trials, cohort studies, case-control studies and other non-randomized intervention studies with an estimate of the effect of exposure to long working hours (41-48, 49-54 and ≥55 h/week), compared with exposure to standard working hours (35-40 h/week), on stroke (prevalence, incidence or mortality). **Study appraisal and synthesis methods:** At least two review authors independently screened titles and abstracts against the eligibility criteria at a first review stage and full texts of potentially eligible records at a second stage, followed by extraction of data from qualifying studies. Missing data were requested from principal study authors. We combined relative risks using random-effects meta-analysis. Two or more review authors assessed the risk of bias, quality of evidence and strength of evidence, using the Navigation Guide and GRADE tools and approaches adapted to this project. **Results:** Twenty-two studies (20 cohort studies, 2 case-control studies) met the inclusion criteria, comprising a total of 839,680 participants (364,616 females) in eight countries from three WHO regions (Americas, Europe, and Western Pacific). The exposure was measured using self-reports in all studies, and the outcome was assessed with administrative health records (13 studies), self-reported physician diagnosis (7 studies), direct diagnosis by a physician (1 study) or during a medical interview (1 study). The outcome was defined as an incident non-fatal stroke event in nine studies (7 cohort studies, 2 case-control studies), incident fatal stroke event in one cohort study and incident non-fatal or fatal ("mixed") event in 12 studies (all cohort studies). Cohort studies were judged to have a relatively low risk of bias; therefore, we prioritized evidence from these studies, but synthesised evidence from case-control studies as supporting evidence. For the bodies of evidence for both outcomes with any eligible studies (i.e. stroke incidence and mortality), we did not have serious concerns for risk of bias (at least for the cohort studies). Eligible studies were found on the effects of long working hours on stroke incidence and mortality, but not prevalence. Compared with working 35-40 h/week, we were uncertain about the effect on incidence of stroke due to working 41-48 h/week (relative risk (RR) 1.04, 95% confidence interval (CI) 0.94-1.14, 18 studies, 277,202 participants, I2 0%, low quality of evidence). There may have been an increased risk for acquiring stroke when working 49-54 h/week compared with 35-40 h/week (RR 1.13, 95% CI 1.00-1.28, 17 studies, 275,181participants, I2 0%, p 0.04, moderate quality of evidence). Compared with working 35-40 h/week, working ≥55 h/week may have led to a moderate, clinically meaningful increase in the risk of acquiring stroke, when followed up between one year and 20 years (RR 1.35, 95% CI 1.13 to 1.61, 7 studies, 162,644 participants, I2 3%, moderate quality of evidence). Compared with working 35-40 h/week, we were very uncertain about the effect on dying (mortality) of stroke due to working 41-48 h/week (RR 1.01, 95% CI 0.91-1.12, 12 studies, 265,937 participants, I2 0%, low quality of evidence), 49-54 h/week (RR 1.13, 95% CI 0.99-1.29, 11 studies, 256,129 participants, I2 0%, low quality of evidence) and 55 h/week (RR 1.08, 95% CI 0.89-1.31, 10 studies, 664,647 participants, I2 20%, low quality of evidence). Subgroup analyses found no evidence for differences by WHO region, age, sex, socioeconomic status and type of stroke. Sensitivity analyses found no differences by outcome definition (exclusively non-fatal or fatal versus "mixed") except for the comparison working ≥55 h/week versus 35-40 h/week for stroke incidence (p for subgroup differences: 0.05), risk of bias ("high"/"probably high" ratings in any domain versus "low"/"probably low" in all domains), effect estimate measures (risk versus hazard versus odds ratios) and comparator (exact versus approximate definition). **Conclusions:** We judged the existing bodies of evidence for human evidence as "inadequate evidence for harmfulness" for all exposure categories for stroke prevalence and mortality and for exposure to 41-48 h/week for stroke incidence. Evidence on exposure to 48-54 h/week and ≥55 h/week was judged as "limited evidence for harmfulness" and "sufficient evidence for harmfulness" for stroke incidence, respectively. Producing estimates for the burden of stroke attributable to exposures to working 48-54 and ≥55 h/week appears evidence-based, and the pooled effect estimates presented in this systematic review could be used as input data for the WHO/ILO Joint Estimates.

Descatha et al. 2020.
Environment International.

Keywords: Global burden of disease; long working hours; meta-analysis; occupational; stroke; systematic review
Evidence Level: 1A
Link: https://www.sciencedirect.com/science/article/pii/S0160412019332118?via%3Dihub

Cumulative exposure to long working hours and occurrence of ischemic heart disease: Evidence from the CONSTANCES cohort at inception
Background: Long-working hours (LWH) are a probable risk factor for ischemic heart diseases (IHD); however, no previous study has considered duration of exposure to LWH when addressing this topic. We aimed to determine the association between cumulative exposure to LWH and IHD while accounting for relevant confounders. **Methods and Results:** In this retrospective study, we included all baseline participants from the French population-based cohort CONSTANCES. Part-time employees and those who reported a cardiac event in the 5 years before LWH exposure were excluded. From self-administered questionnaires and clinical examinations, we obtained participants' age, sex, body mass index, occupational status, smoking habits, high blood pressure, diabetes mellitus, familial history of cardiovascular disease, dyslipidemia, exposure to LWH, and its duration. We defined LWH as working for >10 hours daily for at least 50 days per year. The main outcome was reported history of IHD, ie, myocardial infarction or angina pectoris, during a clinical examination. Of 137 854 included participants, 69 774 were men. There were 1875 cases (1.36%) of IHD, and exposure to LWH was reported by 42 462 subjects (30.8%) among whom 14 474 (10.50%) reported exposure for at least 10 years. Overall, exposure to LWH for ≥10 years was associated with an increased risk of IHD, adjusted odds ratio (aOR) 1.24 (1.08-1.43), P=0.0021. In stratified analyses, this effect was not observed in women, but was significant amongst men, aOR 1.28 (1.11-1.48), P=0.0008. **Conclusions:** This large population-based study supports an association between cumulative exposure to LWH and IHD in men. Future research should consider relevant strategies for reducing LWH exposure and duration.
Fadel et al. 2020.
Journal of American Heart Association, vol. 9, no. 12.

Keywords: Cumulative exposure; epidemiology; ischemic heart disease; long working hours
Evidence Level: 4A
Link: https://www.ahajournals.org/doi/10.1161/JAHA.119.015753

Long working hours and change in body weight: analysis of individual-participant data from 19 cohort studies
Objective: To examine the relation between long working hours and change in body mass index (BMI). **Methods:** We performed random effects meta-analyses using individual-participant data from 19 cohort studies from Europe, US and Australia (n = 122,078), with a mean of 4.4-year follow-up. Working hours were measured at baseline and categorised as part time (<35 h/week), standard weekly hours (35-40 h, reference), 41-48 h, 49-54 h and ≥55 h/week (long working hours). There were four outcomes at follow-up: (1) overweight/obesity (BMI ≥ 25 kg/m2) or (2) overweight (BMI 25-29.9 kg/m2) among participants without overweight/obesity at baseline; (3) obesity (BMI ≥ 30 kg/m2) among participants with overweight at baseline, and (4) weight loss among participants with obesity at baseline. **Results:** Of the 61,143 participants without overweight/obesity at baseline, 20.2% had overweight/obesity at follow-up. Compared with standard weekly working hours, the age-, sex- and socioeconomic status-adjusted relative risk (RR) of overweight/obesity was 0.95 (95% CI 0.90-1.00) for part-time work, 1.07 (1.02-1.12) for 41-48 weekly working hours, 1.09 (1.03-1.16) for 49-54 h and 1.17 (1.08-1.27) for long working hours (P for trend <0.0001). The findings were similar after multivariable adjustment and in subgroup analyses. Long working hours were associated with an excess risk of shift from normal weight to overweight rather than from overweight to obesity. Long working hours were not associated with weight loss among participants with obesity. **Conclusions:** This analysis of large individual-participant data suggests a small excess risk of overweight among the healthy-weight people who work long hours.
Virtanen et al. 2020.
International Journal of Obesity, vol. 44, no. 6.

Keywords: Work; working hours; long hours; body weight obesity
Evidence Level: 1A
Link: https://www.nature.com/articles/s41366-019-0480-3

Objective and subjective working hours and their roles on workers' health among Japanese employees
This study investigated the correlation between objective and subjective working hours (OWH and SWH, respectively) and their relation to the workers' health. The study included 6,806 workers of a Japanese company (response rate=86.6%). OWH were collected as the monthly data during fiscal year 2017 from the company record. SWH were self-reported as the weekly data during the past month in November 2017. Both OWH and SWH corresponded to the same period of one month (October 2017). Additionally, the data for the annual health checkup in fiscal year 2017 and self-reported mental health in November 2017 were collected. The results indicated that the longer OWH was related to more underestimation of SWH. The analyses of covariance adjusted for the selected variables showed that irrespective of OWH or SWH, significant relationships were found for stress responses but not for body mass index, aspartate and alanine aminotransferase, fasting blood glucose, hemoglobin A1c, high-density lipoprotein cholesterol, or triglyceride. However, significant relationships with only OWH were noted for systolic and diastolic blood pressure, low-density lipoprotein cholesterol, gamma-glutamyl transpeptidase, and positive work-related state of mind. The present findings show that SWH should be used carefully when assessing the health effects of long working hours.
Ochiai et al. 2020.
Industrial Health, vol. 58, no. 3.

Keywords: Cardiovascular diseases; exposure assessment; health checkup; karoshi; overtime
Evidence Level: 5B
Link: https://www.jstage.jst.go.jp/article/indhealth/58/3/58_2019-0126/_article

Characteristics of working hours and the risk of occupational injuries among hospital employees: a case-crossover study
Objectives: We investigated the association of working hours with occupational injuries in hospital shift work. **Methods:** Registry data of occupational injuries of hospital employees from 11 towns and 6 hospital districts were linked to daily payroll data to obtain working hours for 37 days preceding the first incidence of the injury (N=18 700). A case-crossover design and associated matched-pair interval analysis were used to compare working hour characteristics for three separate hazard windows among the same subjects. Conditional logistic regression was used to calculate odds ratios (OR) with 95% confidence intervals (CI). **Results:** We found an elevated risk of an occupational injury for workdays with evening shifts (OR 1.09, 95% CI 1.03-1.14) and workdays following night shifts (OR 1.33, 95% CI 1.17-1.52). After excluding commuting injuries, the risk increased during the evening shifts (OR 1.15, 95% CI 1.09-1.23) and the work days following night shifts (OR 1.44, 95% CI 1.24-1.69), but was no more significant during the morning shifts. Injury risk increased following a week of ≥5 morning shifts or ≥3 evening shifts, and following a week of ≥4 quick returns, but did not increase according to the number of preceding night shifts. The length of the work shift (OR 1.22, CI 1.06-1.42) - not the length of the weekly working hours - was associated with an increased risk. **Conclusions:** The results indicate an increased occupational injury risk during the evening shifts and during work days following night shifts, with the risk increasing according to the number of evening but not night shifts.
Harma et al. 2020.
Scandinavian Journal of Work and Environmental Health.

Keywords: Case-crossover study; fatigue; hospital employee; night work; occupational injury; registry data; shift work; shift worker; work hour; working hour; working time
Evidence Level: 5A
Link: https://www.sjweh.fi/show_abstract.php?abstract_id=3905

Building Employer Capability

Wellness Programs

Factors influencing acceptance of personal health record apps for workplace health promotion: Cross-sectional questionnaire study

Background: Health care technologies can help improve workers' health and productivity by supporting workplace health promotion. A personal health record app is used to manage medical data such as results from medical checkups, which facilitates decision making for medical personnel. However, an analysis of users' technology acceptance is required to provide appropriate services based on personal health record apps. **Objective:** The purpose of this study was to analyze the factors influencing the behavioral intention of health experts and workers to use an app in workers' health centers and to examine differences in their perception of the main variables. **Methods:** The study involved health experts and workers who visited 21 workers' health centers in Korea to verify a research model in which perceived risk was added to the unified theory of acceptance and use of technology, a representative theory of information technology acceptance. After receiving ethical approval from the Korea National Institute for Bioethics Policy, 1050 questionnaires were distributed over 7 weeks with cooperation of the Korea Occupational Safety and Health Agency. A multiple linear regression analysis and multigroup path analysis were performed to verify the hypotheses, and independent samples t tests were performed to analyze differences between workers' and health experts' perception of the main variables. **Results:** The analysis included data from 866 respondents (687 workers and 179 health experts). Effort expectancy (beta=.08, P=.03), social influence (beta=.43, P<.001), performance expectancy (beta=.07, P=.008), and facilitating conditions (beta=.13, P<.001) exerted significant positive effects on behavioral intention, whereas perceived risk (beta=-.29, P<.001) exerted a significant negative effect on behavioral intention. Performance expectancy had a significant effect on path differences depending on gender (critical ratio=-3.38) and age (critical ratio=1.97). Workers' mean scores for the main variables were higher relative to those of health experts for all remaining variables except perceived risk, and significant differences were observed for all remaining variables except facilitating condition. **Conclusions:** Social influence exerted the strongest effect on behavioral intention to use the personal health record app. Consequently, it is necessary to coordinate health promotion activities in the workplace as well as the operational direction of community institutions such as in workers' health centers to allow workers to manage their own health via continuous use of the app. In addition, the app should be developed based on a requirement analysis of the balance between both interest groups in consideration of differences in perspective between consumers and service providers.

Park et al. 2020.

JMIR Mhealth Uhealth, vol. 8, no. 6.

Keywords: Perceived risk; personal health record app; unified theory of acceptance and use of technology; workplace health promotion

Evidence Level: 5A

Link: https://mhealth.jmir.org/2020/6/e16723/

Working conditions in social firms and health promotion interventions in relation to employees' health and work-related outcomes - A scoping review

Background: Social firms-a type of social enterprise-offer people with severe disabilities the possibility of employment and integration into the labor market. Since 01 January 2018, social firms in Germany are obligated to provide health promotion interventions for their employees. Therefore, the study aims to provide an overview of the current state of research on working conditions, coping strategies, work- and health-related outcomes, and health promotion interventions in social firms to derive recommendations for action. **Methods:** The databases PubMed, MEDLINE, PsycINFO, PSYNDEX, CINAHL, and Web of Science were searched. The study selection was based on predefined inclusion and exclusion criteria in the time period between 2000 and 2019. The quality of the studies was critically appraised in a standardized way

using the Mixed-Methods Appraisal Tool. **Results:** A total of 25 studies were included. The current state of research indicated that employees with disabilities were provided with several environmental resources like social support, flexibility, structured work tasks or options for training. A mix of environmental and personal resources impacted several work- and health-related outcomes like well-being, job satisfaction, productivity, work engagement, the motivation to work, or job tenure. **Conclusions:** There is a need for further (longitudinal) research concerning the work and health situation of employees working in social firms and the development of health promotion interventions.
Kordsmeyer et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 11.

Keywords: Employment; health promotion; mental health; occupational health; scoping review; social enterprises
Evidence Level: 6A
Link: https://www.mdpi.com/1660-4601/17/11/3963

Organisational Issues

The relationship between workplace ostracism, TMX, task interdependence, and task performance: A Moderated Mediation Model
Background: Social interactions among employees are essential for individual performance as they provide various job-related information and feedback as well as social and emotional support. Tasks have become interdependent among organizational members, allowing teamwork to generally become an organizational norm. Consequently, it is pertinent that employees maintain favorable working relationships with other organizational members because workplace ostracism has become an organizational concern. Although recent studies have examined numerous psychological mechanisms that associate ostracism with workplace outcomes, studies have been limited in exploring practical facets that link the relationship. Thus, this study examined the mediating effect of team-member exchange for workplace ostracism and task performance and the moderating effect of task interdependence in influencing the relationship. **Methods:** Data were collected using a two-wave design and sampled 242 full-time employees in South Korea. The hypotheses were tested with hierarchical regression analyses. **Results:** Team-member exchange was found to mediate the relationship between workplace ostracism and task performance and task interdependence moderated the mediated relationship. **Conclusions:** The results suggest that being ostracized negatively influences the quality of the relationship between team-members which then affects individual performance. In addition, the conditional indirect effect for ostracism on task performance was significant when task interdependence was high, while not significant when it was low, thus moderating the mediated relationship.
Chung et al. 2020.
International Journal of Environmental Medicine and Public Health, vol. 17, no. 12.

Keywords: Moderated mediation; task interdependence; task performance; team–member exchange; workplace ostracism
Evidence Level: 5B
Link: https://www.mdpi.com/1660-4601/17/12/4432

The relationship between workplace justice and self-reported occupational accidents in construction employees of Taiwan
This study investigated the correlation between workplace justice and self-reported occupational accidents among employees of construction industry in Taiwan, and data from a national survey of employees in 2013 was analyzed. This study sampled a total of 1,543 employees age 25 to 65 in the construction industry, among whom 1,379 were men and 164 were women. Information regarding the experience of work-related accidents occurring over the previous 12 months prior to the survey was obtained by a standardized questionnaire. Also obtained were participants' employment conditions, self-reported health, job demands as well as workplace justice. The prevalence rates of occupational accidents in man and

women were 22.84% and 13.41%, respectively. Under controlling participants' employment conditions, self-reported health and job demands there was higher rate of occupational accidents among male construction employees with lower workplace justice. This study provides directions for occupational safety and health interventions.

Hsieh et al. 2020.

Industry Health, vol. 58, no. 3.

Keywords: Construction; employee; job demands; occupational accidents; workplace justice

Evidence Level: 4B

Link: https://www.jstage.jst.go.jp/article/indhealth/58/3/58_2019-0131/_article

How is work-life balance arrangement associated with organisational performance? A meta-analysis

The impacts of the work-life balance arrangement on organisational performance is a growing concern amongst researchers and practitioners. This study synthesised 202 records from 58 published papers to evaluate the relationship between the work-life balance arrangement and organisational performance by means of a meta-analysis. The organisational performance was measured based on six perspectives, including career motivation, employee attendance, employee recruitment, employee retention, organisational commitment, and productivity. The results showed a positive relationship between the work-life balance arrangement and organisational performance (OR: 1.181, 95% CI: 1.125-1.240, $p < 0.001$). Of the six perspectives, only career motivation, employee attendance, employee recruitment, and employee retention were significantly associated with the work-life balance arrangement. The moderators affecting the relationship between the work-life balance arrangement and organisational performance were gender, sector, and employee hierarchy. The results provide theoretical suggestions on the effectiveness of the work-life balance arrangement in terms of the six perspectives related to organisational performance.

Wong et al. 2020.

International Journal of Environmental Research and Public Heath, vol. 17, no. 12.

Keywords: Meta-analysis; organisational commitment; organisational performance; productivity

Evidence Level: 1A

Link: https://www.mdpi.com/1660-4601/17/12/4446

Shift Work

Preventing shift work disorder in shift health-care workers

The occurrence of the shift work disorder (SWD) in health-care workers (HCWs) employed in 24/7 hospital wards is a major concern through the world. In accordance with literature, SWD is the most frequent work-related disturb in HCWs working on shift schedules including night shift. In agreement with the Luxembourg Declaration on workplace health promotion (WHP) in the European Union, a WHP program has been developed in a large Hospital, involving both individual-oriented and organizational-oriented measures, with the aim to prevent the occurrence of SWD in nurses working on shifts including night shift. The objective assessment of rotating shift work risk and the excessive sleepiness were detected before and after the implementation of the WHP program, by using the Rotating Shiftwork-questionnaire and the Epworth Sleepiness Scale. The findings of this study showed the effectiveness of the implemented WHP program in minimizing the impact of shift work on workers' health and in preventing the misalignment between sleep-wake rhythm and shift working.

D'Ettorre et al. 2020.

Safety and Health at Work, vol. 11, no. 2.

Keywords: Epworth sleepiness scale; night work; RSQ-questionnaire; shift work; workplace health promotion

Evidence Level: 6A
Link: https://www.sciencedirect.com/science/article/pii/S2093791119306845?via%3Dihub

Measuring the effects of night-shift work on cardiac autonomic modulation: an appraisal of heart rate variability metrics
Night-shift workers may develop poor cardiovascular health. Studies about heart rate variability (HRV) metrics could identify risk factors in this population and be used to examine the effectiveness of interventions for optimizing the health of night-shift workers. The purpose of this review was to examine the use of HRV methodologies in studies about night-shift work. Overall, 34 articles met the selection criteria and underwent a methodological critique. The main conclusion across these studies was that night-shift work could increase the sympathetic influences on the variability between heartbeats. In many cases, however, important methodological details were omitted (e.g., the number and duration of electrocardiogram recordings, sampling rates, R-R segment duration, wavelet transform methods). Recommendations include adding measures of disease outcomes, using ≥250 Hz sampling rates and 600-s R-R segments, and measuring sleep and circadian rhythms. With these approaches, researchers can design investigations that identify therapeutic targets for improving the health of night-shift workers.
Fink et al. 2020.
International Journal of Occupational Medicine and Environmental Health, vol. 33, no. 4.

Keywords: Circadian rhythm; heart rate variability; night shift; parasympathetic nervous system; sleep; sympathetic nervous system
Evidence Level: 6A
Link: http://ijomeh.eu/Measuring-the-effects-of-night-shift-work-on-cardiac-autonomic-modulation-An-appraisal,120237,0,2.html

Effect of Suvorexant vs placebo on total daytime sleep hours in shift workers: A randomized clinical trial
Importance: Many shift workers have difficulty sleeping during the daytime owing to an inappropriately timed circadian drive for wakefulness. **Objective:** To determine whether a dual hypocretin receptor antagonist would enable shift workers to have more daytime sleep. **Design, setting, and participants:** This double-blind, placebo-controlled randomized clinical trial included 2 weeks of baseline data and 3 weeks of intervention data, from March 2016 to December 2018. Individuals were recruited through poster advertisements in the broader San Francisco Bay area in California. From an initial voluntary recruitment cohort of 38 shift workers, 19 individuals with self-reported difficulty sleeping during the daytime following night work shift were included. Data were analyzed from January to March 2019. **Interventions:** 1 week of 10 mg suvorexant or placebo, titrated upward to 20 mg suvorexant or placebo for 2 additional weeks. **Main outcomes and measures:** Objective (ie, actigraphy) and subjective (ie, sleep logs) measures of sleep. **Results:** Among 19 participants who completed the study (mean [SD] age, 37.7 [11.1] years; 13 [68%] men), 8 participants (42%) were assigned to the suvorexant group and 11 participants (58%) were assigned to the placebo group. Compared with individuals in the placebo group, individuals in the suvorexant group increased their objective total sleep time by a mean (SE) of 1.04 (0.53) hours (P = .05) at the end of 1 week of 10-mg doses and by 2.16 (0.75) hours (P = .004) by the end of the 2 weeks of 20-mg doses. Subjective sleep was similarly improved as, compared with the placebo group, individuals in the suvorexant group increased their subjective total sleep time by a mean (SE) of 2.08 (0.47) hours (P < .001) at the end of 1 week of 10-mg doses and by 2.97 (0.56) hours (P < .001) by the end of the 2 weeks of 20-mg doses. Physician ratings of daytime sleep aligned with these measures, as there was no change in the placebo group and a much improved change in the suvorexant group. No adverse events were reported in the suvorexant group. **Conclusions and relevance:** This pilot study found that the use of a dual hypocretin receptor antagonist in shift workers under real-world conditions resulted in more than 2 extra hours of daytime sleep per episode. Future research should confirm this pilot finding in a larger sample size and examine whether, over the long term, use of this medication has a concomitant improvement in medical and psychiatric health as well as workplace performance and safety.
Zeitzer et al. 2020.
JAMA Network Open, vol. 3, no. 6.

Keywords: Survorexant; daytime; sleep; shift workers; circadian drive
Evidence Level: 1A
Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2766606

High-intensity training reduces CVD risk factors among rotating shift workers: An eight-week intervention in industry
Rotating shift work is associated with risk factors for cardiovascular disease (CVD). We have studied the effect of 17 min high-intensity training three times a week over eight weeks on CVD risk factors among shift workers. Sixty-five shift workers from two plants were recruited. They were all deemed healthy at the initial health screening and in 100% work. From plant A, 42 workers, and plant B, 23 workers participated. After the intervention, 56 workers were retested. The intervention group consisted of 19 participants from plant A who had participated in at least 10 sessions. Twenty workers from plant B and 17 workers from plant A that not had taken part in the training were included in the control group. All workers reported physical activity (PA) by questionnaires before and after the training intervention. We measured blood pressure, heart rate, lipids, glycated hemoglobin (HbA1c), and C-reactive protein (CRP) and arterial stiffness. Maximal oxygen uptake (V̇O2max) was assessed by bicycle ergometry. The intervention group favorably differed significantly from the control group in improvement of systolic and diastolic blood pressure and glycated hemoglobin (HbA1c). Short training sessions with 4 min of high-intensity PA, three times a week, for eight weeks among rotating shift workers reduced some CVD risk factors. PA interventions in occupational settings may thus decrease coronary heart disease and stroke incidences in this vulnerable group of workers.
Mamen et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 11.

Keywords: Cardiovascular; occupational health; physical activity; shift work
Evidence Level: 3A
Link: https://www.mdpi.com/1660-4601/17/11/3943

Management and Leadership

Leader behavioral integrity and employee in-role performance: The roles of coworker support and job autonomy
The positive relationship between leader behavioral integrity and an employee's in-role performance is well-established, but explanations for why this effect exists are still in a nascent stage. Drawing upon leader behavioral integrity theory and job-demands resources theory, the authors explain how leader behavioral integrity facilitates employee in-role performance and the boundary conditions influencing the relationship between leader behavioral integrity and employee in-role performance. Using multisource data from 209 employee-manager dyads in South Korea, this paper found support for the mediating effect of coworker support in the positive relationship between leader behavior integrity and employees' in-role autonomy. Furthermore, compared to those who perceive low job autonomy, the positive indirect effect of leader behavioral integrity on in-role performance via coworker support was stronger for employees who perceive high job autonomy. The findings emphasize the importance of a leader's individual difference (i.e., leader behavioral integrity) and job resources (i.e., job autonomy) facilitating the receipt of team members' supporting behaviors which, in turn, energize employee in-role performance. Theoretical and practical implications are discussed.
Choi et al. 2020.
International Journal of Environmental Research and Public Health, vol. 17, no. 12.

Keywords: Behavioral integrity; coworker support; in-role performance; job autonomy
Evidence Level: 6B
Link: https://www.mdpi.com/1660-4601/17/12/4303

Adapting to the Future of Work

Technology

Problematic internet use and perceived quality of life: Findings from a cross-sectional study investigating work-time and leisure-time internet use

Avoiding the potential negative impact brought by problematic internet use is becoming more important. To better understand public health and addiction, this study investigated to what extent work-time and leisure-time internet use relate to problematic internet use and perceived quality of life among college students and highly educated adults. An online cross-sectional survey with 446 individuals was assessed in Germany. Linear regression analyses were used to predict problematic internet use. Ordinal regression analyses were applied to predict perceived quality of life. Results showed that leisure-time internet use, but not work-time internet use, was positively associated with problematic internet use. Participants whose work-time internet use could be considered balanced (5-28 h/week in this study) indicated a higher perceived quality of life compared to individuals with little or large amount of internet use for work. The findings still emerged when taking negative feelings, perceived stress, smoking status and alcohol consumption into account. As both work-time and leisure-time internet use can be risk factors for mental health in terms of problematic internet use and perceived quality of life, well-controlled internet use rather than excessive use is recommended. This should be kept in mind when dealing with the Coronavirus pandemic and its aftermath.

Gao et al. 2020.

International Journal of Environmental Research and Public Heath, vol. 17, no. 11.

Keywords: Internet addiction; leisure; quality of life; smoking; stress; work

Evidence Level: 4A

Link: https://www.mdpi.com/1660-4601/17/11/4056

Work Environment

Office design as a risk factor for disability retirement: A prospective registry study of Norwegian employees

Objectives: This aim of this study was to (i) examine differences in risk of subsequent disability retirement between employees working in cellular, shared, and open-plan offices and (ii) determine the contribution of gender, skill-level, work ability, medically certified sickness absence, leadership position, and personality traits (extroversion, agreeableness, conscientiousness, neuroticism, and openness) as confounders. **Methods:** Survey data on predictor variables combined with official objective registry data on disability retirement and sickness absence were extracted from a large Norwegian occupational cohort of office workers (N=6779, 53.5% women). Questionnaire data included the respondents' office designs, comparing cellular, shared, and open-plan offices, demographic characteristics, workability, and personality factors. Objective data on disability retirement and medically certified sickness absence were extracted from the sickness and disability benefit register of the Norwegian Labor and Welfare Administration. **Results:** In the final fully adjusted model, employees working in shared [hazard rato (HR) 1.52, 95% confidence interval (CI) 1.08-2.16] and open-plan (HR 1.95, 95% CI 1.31-2.90) offices had significantly higher risk of subsequent disability retirement compared to employees in cellular offices. Gender, work ability, medically certified sickness absence, and conscientiousness had independent direct effects on risk of disability retirement. **Conclusion:** This study shows that open and shared workspace designs have detrimental effects by increasing risk of disability retirement among office workers, even when taking other known predictive factors into account.

Nielsen et al. 2020.

Scandinavian Journal of Work and Environmental Health.

Keywords: Office design; risk factor; disability; retirement; employees

Evidence Level: 4B

Link: https://www.sjweh.fi/show_abstract.php?abstract_id=3907

Guiding and Supporting Mental Health and Wellbeing

Mental Health

Objective work-related factors, job satisfaction and depression: An empirical study among internal migrants in China

This study examines the associations between objective work-related factors, job satisfaction and depression among migrants in China. Data from a representative sample of Chinese migrants named Management and Services of Migrants Study (MSMS) were used after excluding 1068 self-employed participants. We employed multivariate linear regression analysis. Depression was measured by the Centre for Epidemiologic Study Depression (C-ESD) scale. Objective work-related factors included firm size, job classification, mode of employment, working hours per week, union membership and working overtime compulsorily. Measurement of job satisfaction was derived from the Job Descriptive Index. We found that migrants in the sales/services sector and the clerical/technical/managerial sector had more depressive symptoms compared with those in the manufacturing/transportation sector. Working more than 55 h per week was associated with more depressive symptoms. Working overtime compulsorily and joining a labour union were all associated with more depressive symptoms. In addition, job satisfaction was negatively associated with depressive symptoms. The research findings on the relationship between work-related factors and depressive symptoms may serve as a guide for vocational rehabilitation counselling programs and for further research on depression in workplaces.

Zhang et al. 2020.
Healthcare (Basel), vol. 8, no. 2.

Keywords: Depression; job satisfaction; migrants; objective work-related factors
Evidence Level: 4B
Link: https://www.mdpi.com/2227-9032/8/2/163

Psychosocial work exposures and suicide ideation: a study of multiple exposures using the French national working conditions survey

Background: Our study aimed to explore the associations between psychosocial work exposures, as well as other occupational exposures, and suicide ideation in the French national working population. An additional objective was to study the cumulative role of occupational exposures in this outcome. **Methods:** The study was based on a nationally representative sample of the French working population of 20,430 employees, 8579 men and 11,851 women (2016 French national Working Conditions survey). Occupational exposures included 21 psychosocial work factors, 4 factors related to working time/hours and 4 factors related to the physical work environment. Suicide ideation within the last 12 months was the outcome. The associations between exposures and outcome were studied using weighted logistic regression models adjusted for covariates. **Results:** The 12-month prevalence of suicide ideation was 5.2% among men and 5.7% among women. Among the occupational exposures, psychosocial work factors were found to be associated with suicide ideation: quantitative and cognitive demands, low influence and possibilities for development, low meaning at work, low sense of community, role conflict, job insecurity, temporary employment, changes at work, and internal violence. Some rare differences in these associations were observed between genders. Linear associations were observed between the number of psychosocial work exposures and suicide ideation. **Conclusions:** Psychosocial work factors were found to play a major role in suicide ideation, and their effects were cumulative on this outcome. More research on multiple and cumulative exposures and suicide ideation and more prevention towards the psychosocial work environment are needed.

Niedhammer et al. 2020.
BMC Public Health, vol. 20, no. 1.

Keywords: Job stress; occupational exposures; psychosocial work factors; suicide ideation; working conditions
Evidence Level: 4B
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09019-3

Transtheoretical model is better predictor of physiological stress than perceived stress scale and work ability index among office workers

Physical activity impacts positively on stress and anxiety. Working conditions affect the quality of life by increasing stress levels, which can affect job performance and work absence. The Perceived Stress Scale (PSS), Work Ability Index (WAI), Transtheoretical Model (TTM), as well as heart rate variability (HRV) have been applied to monitor the state of workers in their job. The aim of this study was to analyze PSS, WAI, and TTM classifications, and to find out how are they linked to physiological stress (HRV). One hundred and thirteen office workers responded to the three questionnaires and their HRV was monitored for at least two full days. Groups were set up according to TTM (Stage 1, Stage 2, Stage 3-4, Stage 5), WAI (weak WAI, medium WAI, good WAI), and PSS (low PSS, medium PSS, high PSS). Results obtained from the test were related to stress values measured by HRV with a Bodyguard2 device. The Stage 5 group from TTM had better HVR and stress levels than the other groups for both women and men ($p < 0.05$). Participants in the good WAI group and low PSS group had better results than weak WAI and high PSS, but the differences with respect to medium WAI and medium PSS were less clear. Finally, TTM seemed to be the best tool to discriminate physiological stress in office workers with regard to other questionnaires.

Marin-Farrona et al. 2020.

International Journal of Environmental Research and Public Heath, vol. 17, no. 12.

Keywords: Perceived stress scale; transtheoretical model; work ability index; heart rate variability; office workers; physical activity; stress

Evidence Level: 5A

Link: https://www.mdpi.com/1660-4601/17/12/4410

Bullying and Harassment

Job-related and nonjob-related gossips among low-ranked employees in unionized service organization

Workplace incivility is a common phenomenon that is frequently found across all organizations and cultures. This study was planned to investigate the impact of workplace incivility on job and non-job related gossips through the mediating role of cynicism and psychological contract violation. The perspective of low-ranked unionized employees was explored through a survey method by using stratified sampling in eight strata, which were formulated based on geographical distribution. A total of four hundred questionnaires were distributed among the employees of eight circles, 50 from each, while use able responses remained 301. SmartPLS was used to analyze the data through structural equation modeling. From a theoretical perspective, this study has made several contributions by investigating the impact of workplace incivility in the South Asian context and documenting the impact of incivility from the perspective of individuals belonging to minority socio-cultural status. Besides supporting existing literature, this study provided a unique argument that low-ranked employees in South Asian societies do not spread nonjob-related gossips. This finding is contradictory to the existing literature; and, thus, calls for future research to identify this inconsistency. Limitations and future directions are also discussed.

Bashir et al. 2020.

Frontiers of Psychology, vol. 11, no. 994.

Keywords: Cynicism; gossips; incivility; low-ranked employees; psychological contract violation; union members

Evidence Level: 5B

Link: https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00994/full

Impacts of stigma and discrimination in the workplace on people living with psychosis

Background: Employment holds many benefits for people living with psychosis. However, significant barriers to employment for this cohort appear to exist, notably stigma and discrimination against people living with serious mental health conditions. We asked: Would a qualitative sample including multiple stakeholder groups reveal similar results and if so, what would be the main impacts of such stigma and discrimination? **Method:** This analysis used data from a qualitative study that had employed focus groups

and interviews to investigate the employment barriers and support needs of people living with psychosis, including views of the multiple stakeholders (those living with mental health conditions, health professionals, care-givers, employments consultants and community members and employers). **Results:** The impacts of workplace stigma and discrimination on people living with psychosis included work avoidance, reluctance to disclose mental health conditions to employers, work-related stress, and reduced longevity of employment. **Conclusions:** Significant impacts from such stigma and discrimination were found in this study. The findings indicate a need to provide support mechanisms and to change the culture of workplaces to improve employment opportunities and outcomes for people living with psychosis.
Hampson et al. 2020.
BMC Psychiatry, vol. 20, no. 1.

Keywords: Discrimination; employers; psychosis; stigma; workplace
Evidence Level: 5A
Link: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-020-02614-z

Workplace bullying and sleep - A systematic review and meta-analysis of the research literature
This systematic review and meta-analysis 1) clarifies and quantifies existing results on the association between exposure to workplace bullying and sleep, 2) evaluates the methodological quality of existing studies, 3) identifies theoretical frameworks used in research, 4) determines moderating and mediating variables, and 5) provides guidelines for future research. Searches for primary studies were conducted in Pubmed, Medline, Embase, PsycINFO and Web of Science. Of the 406 studies identified, 26 fulfilled the inclusion criteria for the qualitative synthesis whereas sixteen studies were included in the meta-analysis (cross sectional effect sizes: 15; N = 69,199/prospective effect sizes: 6; N = 26,164). Workplace bullying was significantly related to sleep problems in all studies. Across cross-sectional studies, targets of bullying had 2.31 higher odds of reporting sleep problems compared to non-bullied workers. The odds across the prospective studies was 1.62. The quality of evidence for the association between workplace bullying and sleep problems was low to moderate. Only eight studies had a predefined theoretical rationale for the association, and few studies examined mediating and moderating variables or bidirectional associations. The methodological quality of the studies was moderate. Further research is needed to establish the nature, directionality, mechanisms, and conditions of the association between bullying and sleep.
Nielsen et al. 2020.
Sleep Medicine Review, vol. 51.

Keywords: Aggression; bullying; harassment; insomnia; review; sleep
Evidence Level: 1A
Link: https://www.sciencedirect.com/science/article/pii/S1087079220300320?via%3Dihub

Enabling Healthy and Safe Workplaces

Health and Wellbeing

Work-related physical activity and psychological distress among women in different occupations: a cross-sectional study
Background: Recent evidence suggests that work-related physical activity may not have the same mental health benefits as leisure-time physical activity. Further, work-related physical activity is likely to include a variety of different behaviours for people with different occupations. As such, the aim of this study was to determine if occupation type moderated the association between work-related physical activity and psychological distress. **Methods:** A randomly selected sample of 1080 women from Melbourne, Australia completed the International Physical Activity Questionnaire (IPAQ) and General Health Questionnaire (GHQ-30), and reported their current occupation. **Results:** Linear regression analyses indicated that occupation significantly moderated the association between work-related walking and psychological distress ($F [8, 55] = 2.26$, $p = .036$). Given evidence of moderation, we fitted linear regression models to test the associations between work-related physical activity and psychological distress for three separate

groups; professionals, sales and services workers, and tradespersons. Female tradespersons who engaged in a low (B = - 3.81, p = .006) or high amount of work-related walking (B = - 3.23, p = .029), had significantly lower psychological distress symptoms than those who engaged in no work-related walking. There were no significant associations between work-related physical activity of any intensity and psychological distress for professionals, or sales and service workers. **Conclusions:** Given the relationship does not exist across all occupations, work-related physical activity should not be promoted above and beyond leisure-time physical activity. However, walking at work may be important in reducing psychological distress for some people and should therefore, not be discounted.
White et al. 2020.
BMC Public Health vol. 20, no. 1.

Keywords: Exercise; mental health; occupations; physical activity; psychological distress; tradesperson; work
Evidence Level: 4A
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09112-7

Longitudinal analysis of work-to-family conflict and self-reported general health among working parents in Germany
The combination of work and family roles can lead to work-to-family conflict (WTFC), which may have consequences for the parents' health. We examined the association between WTFC and self-reported general health among working parents in Germany over time. Data were drawn from wave 6 (2013) and wave 8 (2015) of the German family and relationship panel. It included working persons living together with at least one child in the household (791 mothers and 723 fathers). Using logistic regressions, we estimated the longitudinal effects of WTFC in wave 6 and 8 on self-reported general health in wave 8. Moderating effects of education were also considered. The odds ratio for poor self-reported general health for mothers who developed WTFC in wave 8 compared to mothers who never reported conflicts was 2.4 (95% CI: 1.54-3.68). For fathers with newly emerged WTFC in wave 8, the odds ratio was 1.8 (95% CI: 1.03-3.04). Interactions of WTFC with low education showed no significant effects on self-reported general health, although tendencies show that fathers with lower education are more affected. It remains to be discussed how health-related consequences of WTFC can be reduced e.g., through workplace interventions and reconciliation policies.
Borgmann et al. 2020.
International Journal of Environmental Research and Public Health, vol. 17, no. 11.

Keywords: Germany; education; logistic regression; longitudinal analysis; moderator analysis; pairfam; predictive margins; self-reported general health; work-to-family conflicts
Evidence Level: 4A
Link: https://www.mdpi.com/1660-4601/17/11/3966

Moderated mediation effect of mindfulness on the relationship between muscular skeletal disease, job stress, and turnover among Korean firefighters
Background: This study investigated the effect of increased job stress, caused by musculoskeletal disease (MSD) among firefighters, on a firefighter's intention to leave the profession, henceforth referred to as "turnover intention," and verified the moderating effect of mindfulness on such a relationship. **Methods:** A survey involving a total of 549 Korean male firefighters as participants was conducted herein, and the following results were obtained: the mediation effect of the MSD to turnover intention through job stress was confirmed, and the indirect effect of job stress was verified. **Results:** We verified the moderated mediation effect of mindfulness on the relation:MSD, job stress, and turnover intention. The conditional indirect effect for middle and high levels of mindfulness is significant. **Conclusion:** The result of this study is supported by proofs of the relationship between a firefighter's MSD, job stress, and turnover intention, and these case studies reveal the moderated mediation effect of dispositional mindfulness.
Lee et al. 2020.
Safety and Health at Work, vol. 11, no. 2.

Keywords: Firefighter; job stress; mindfulness; moderated mediation effect; musculoskeletal disease
Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S2093791119302276?via%3Dihub

Work Health and Safety

Risk factors for collisions and near-miss incidents caused by drowsy bus drivers
Serious accidents have been caused by drowsy bus drivers and have necessitated an examination of the risk factors involved. A questionnaire survey among employees of a bus company was conducted in Ibaraki Prefecture, Japan in September 2014. Respondents were asked to report details of their work and life over the preceding month. The 301 valid responses by bus drivers (295 men and 6 women) with a mean age of 51.6 years (range: 24-73 years) were used for analysis. Univariable logistic regression showed that factors affecting the incidence of collisions and near-miss incidents by drowsy drivers were continued driving when feeling sick, reporting a physical condition, number of sleep hours, time spent with family, working hours, and nutritional balance. According to a multiple regression analysis, continued driving when feeling sick (odds ratio: 3.421, 95% confidence interval: 1.618-7.231) was the only significant risk for the event. Managers should encourage drivers to voluntarily report poor health and should provide opportunities to stop driving if drivers experience physical discomfort or sleepiness. To improve road safety, educational measures are required for both drivers and managers to prevent driving under poor health conditions, although the decision to stop driving depends on drivers' subjective judgment.
Miyama et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 12.

Keywords: Bus drivers; drowsy driving; risk factors; risk management; safety education
Evidence Level: 5B
Link: https://www.mdpi.com/1660-4601/17/12/4370

Risk Assessment

Using workers' compensation claims data to describe nonfatal injuries among workers in Alaska
Background: To gain a better understanding of nonfatal injuries in Alaska, underutilized data sources such as workers' compensation claims must be analyzed. The purpose of the current study was to utilize workers' compensation claims data to estimate the risk of nonfatal, work-related injuries among occupations in Alaska, characterize injury patterns, and prioritize future research. **Methods:** A dataset with information on all submitted claims during 2014-2015 was provided for analysis. Claims were manually reviewed and coded. For inclusion in this study, claims had to represent incidents that resulted in a nonfatal acute traumatic injury, occurred in Alaska during 2014-2015, and were approved for compensation. **Results:** Construction workers had the highest number of injuries (2,220), but a rate lower than the overall rate (34 per 1,000 construction workers, compared to 40 per 1,000 workers overall). Fire fighters had the highest rate of injuries on the job, with 162 injuries per 1,000 workers, followed by law enforcement officers with 121 injuries per 1,000 workers. The most common types of injuries across all occupations were sprains/strains/tears, contusions, and lacerations. **Conclusion:** The successful use of Alaska workers' compensation data demonstrates that the information provided in the claims dataset is meaningful for epidemiologic research. The predominance of sprains, strains, and tears among all occupations in Alaska indicates that ergonomic interventions to prevent overexertion are needed. These findings will be used to promote and guide future injury prevention research and interventions.
Lucas et al. 2020.
Safety and Health at Work, vol. 11, no. 2.

Keywords: Alaska; occupational injuries; workers' compensation

Evidence Level: 5B
Link: https://www.sciencedirect.com/science/article/pii/S2093791119305086?via%3Dihub

Factors related to turnover intentions and work-related injuries and accidents among professional caregivers: a cross-sectional questionnaire study
Background: The Japanese health and welfare industry has a shortage of professional caregivers, and work-related accidents and injuries among this group are therefore especially critical issues. This study aimed to examine the factors associated with turnover intentions and work-related injuries and accidents among professional caregivers in Japan. **Methods:** Self-report questionnaires were distributed to care workers (N = 1396) at 26 geriatric-care facilities. The questionnaire addressed basic attributes, work and organizational characteristics, wage adequacy, and intrinsic motivations for work (e.g., "being suited to caring work"). Social-relational aspects of the work environment were assessed via three subscales of the Social Capital and Ethical Climate in the Workplace instrument (i.e., "Social Capital in the Workplace," "Exclusive Workplace Climate," and "Ethical Leadership"). Dependent variables were the experience of work-related accidents or injuries in the prior year and organizational and occupational turnover intentions. We used datasets of professional caregivers for analyses. **Results:** The response rate was 68% (N = 949). Among the 667 professional caregivers, 63% were female. On multivariable logistic regression analysis for work-related accidents and injuries for each sex, those with higher scores for "being suited to caring work" were found to experience significantly fewer work-related accidents and injuries (odds ratio [OR] = 0.78, $p < 0.01$) among female caregivers. Male caregivers who perceived an exclusive workplace climate experienced more work-related accidents and injuries (OR = 1.61, $p < 0.01$). However, experience of work-related accidents and injuries did not show significant relationships with organizational and occupational turnover intentions. Additionally, "being suited to caring work" (OR = 0.73, $p < 0.01$) and ethical leadership (OR = 0.76, $p < 0.05$) were found to be negatively associated with organizational turnover intentions. "Being suited to caring work" (OR = 0.61, $p < 0.01$), inadequacy of wage (OR = 2.22, $p < 0.05$), and marital status (OR = 2.69, $p < 0.01$) were also associated with occupational turnover intentions of professional caregivers. **Conclusions:** These findings highlight the need to foster intrinsic motivations for work as well as providing a supportive and ethical work environment to reduce high turnover rates and work-related injuries and accidents among professional caregivers.
Tei-Tominaga et al. 2020.
Environmental Health and Preventative Medicine, vol. 25, no. 1.

Keywords: Professional caregiver; turnover; work environment; work-related accident and injury
Evidence Level: 4B
Link: https://environhealthprevmed.biomedcentral.com/articles/10.1186/s12199-020-00863-8

Chronic Health Issues

Mortality among persons with both asthma and chronic obstructive pulmonary disease aged ≥25 years, by industry and occupation - United States, 1999-2016
Patients with asthma typically have chronic airway inflammation, variable airflow limitation, and intermittent respiratory symptoms; patients with chronic obstructive pulmonary disease (COPD) often have fixed airflow limitation and persistent respiratory symptoms. Some patients exhibit features suggesting that they have both conditions, which is termed asthma-COPD overlap. These patients have been reported to have worse health outcomes than do those with asthma or COPD alone (1). To describe mortality among persons aged ≥25 years with asthma-COPD overlap, CDC analyzed 1999-2016 National Vital Statistics multiple-cause-of-death mortality data* extracted from the National Occupational Mortality System (NOMS), which included industry and occupation† information collected from 26 states§ for the years 1999, 2003, 2004, and 2007-2014. Age-adjusted death rates per one million persons¶ and proportionate mortality ratios (PMRs)** were calculated. During 1999-2016, 6,738 male decedents (age-adjusted rate per million = 4.30) and 12,028 female decedents (5.59) had both asthma and COPD assigned on their death certificate as the underlying or contributing cause of death. The annual age-adjusted death rate per million among decedents with asthma-COPD overlap declined from 6.70 in 1999 to 3.01 in 2016 ($p<0.05$) for men

and from 7.71 in 1999 to 4.01 in 2016 (p<0.05) for women. Among adults aged 25-64 years, asthma-COPD overlap PMRs, by industry, were significantly elevated among nonpaid workers, nonworkers, and persons working at home for both men (1.72) and women (1.40) and among male food, beverage, and tobacco products workers (2.64). By occupation, asthma-COPD overlap PMRs were significantly elevated among both men (1.98) and women (1.79) who were unemployed, had never worked, or were disabled workers and among women bartenders (3.28) and homemakers (1.34). The association between asthma-COPD overlap mortality and nonworking status among adults aged 25-64 years suggests that asthma-COPD overlap might be associated with substantial morbidity. Increased risk for asthma-COPD overlap mortality among adults in certain industries and occupations suggests targets for public health interventions (e.g., elimination of or removal from exposures, engineering controls, and workplace smoke-free policies) to prevent asthma and COPD in and out of the workplace.
Dodd et al. 2020.
Morbidity and Mortality Weekly Report, vol. 69, no. 22.
Keywords: Mortality; asthma; chronic obstruction pulmonary disease; industry; occupation
Evidence Level: 4A
Link: https://www.cdc.gov/mmwr/volumes/69/wr/mm6922a3.htm?s_cid=mm6922a3_w

The impact of Thyroid diseases on the working life of patients: A systematic review
Thyroid diseases are characterized by a wide range of physical and mental symptoms that can affect biological function, emotional and social life of patients. However, their impact on work functioning is not yet fully understood. Therefore, this review aims to address the way in which thyroid diseases can affect occupational outcomes, i.e., the employment rate, sick leave, working capacity and work income of patients. A systematic review of Pubmed, Scopus and ISI Web of Knowledge databases has been performed. Although it is not possible to extrapolate precise data for benign pathologies, about a third of the survivors of thyroid cancer could be unemployed. Hyperthyroid and hypothyroid patients presented a greater risk of long-term sick leave than controls, depending on the severity of the disease. Hyperthyroidism impaired working ability in about a third of affected patients, particularly in cases complicated by orbitopathy with diplopia. A possible influence of thyroid diseases on various occupational outcomes emerged from our review, however further research seems necessary to understand the relationship between work problems, specific pathological characteristics over time and risk factors in the workplace. This may support a comprehensive, interdisciplinary management of thyroid disorders, with benefits for patients' personal, social and professional life.
Leso et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 12.
User License: Creative Commons Attribution (CC BY 4.0**) (**https://creativecommons.org/licenses/by/4.0/)
Keywords: Hyperthyroidism; hypothyroidism; occupation; professional life; thyroid cancers; work ability
Evidence Level: 1A
Link: https://www.mdpi.com/1660-4601/17/12/4295

Occupational Exposure

Carpal tunnel syndrome and exposure to work-related biomechanical stressors and chemicals: Findings from the Constances cohort
Objective: To investigate the effects of co-exposure to biomechanical wrist stressors and chemicals on the risk of CTS in a large cohort of French workers. **Methods:** Prospective study using the data collected at baseline and at the first 12 month-follow-up for the 18,018 participants included in the population-based Constances cohort between 2012 and 2015. CTS at follow-up and exposure to biomechanical wrist stressors and chemicals at baseline were assessed using a self-administered questionnaire. Associations between CTS and co-exposure to biomechanical wrist stressors and chemicals were studied using multivariate logistic regression models, adjusted for personal/medical factors. **Results:** 184 men (2.1%, 95%CI 1.8-2.4) and 331 women (3.6%, 3.2-3.9) free from chronic hand symptoms at baseline declared suffering from unilateral/bilateral CTS at follow-up. A potentiating effect of co-exposure to biomechanical wrist stressors and chemicals on the risk of CTS was found for both genders, with higher OR in the co-exposure group (OR

= 3.38 [2.29-5.01] in men and OR = 4.12 [2.73-6.21] in women) than in the biomechanical exposure group (OR = 2.14 [1.51-3.03] in men and OR = 2.19 [1.72-2.78] in women) compared to no exposure group. **Conclusions:** The study showed an association between CTS and co-exposure to biomechanical wrist stressors and chemicals, after adjustment for the main personal and medical factors. This finding should be confirmed using more objective case definition of CTS and assessment of the chemical exposure before drawing conclusions on the possible synergistic effects of mechanical stressors and chemical on the median nerve.

Roquelaure et al. 2020.

PLoS One, vol. 15, no. 6.

Keywords: Carpal tunnel syndrome; occupational exposure; biomechanical stressor; chemicals

Evidence Level: 4B

Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0235051

Characteristics of occupational exposure to diesel engine exhaust for shipyard transporter signal workers

Background: Workers performing signal work for a heavy-duty shipyard transporter are exposed to diesel engine exhaust (DEE), which is classified as a Group 1 carcinogen by the International Agency for Research on Cancer. Here, we evaluate DEE exposure levels for workers engaged in shipyard transporter signal work through measurement of respirable elemental carbon (EC), organic carbon (OC), and total carbon (TC), and identify the factors affecting exposure. **Methods:** Sixty signal workers were selected, and measured samples were analyzed by thermo-optical transmittance. **Results:** The mean EC exposure level of a transporter signal worker was 4.16 μg/m3, with a range of 0.69 to 47.81 μg/m3. EC, OC, and TC exposure levels did not show statistically significant differences for individual variables except the measurement date. This was influenced by meteorological factors such as wind speed, and it was confirmed that the work position, number carried, and load capacity in the multiple regression analysis after minimizing the meteorological effects were factors influencing the EC exposure level of the signalman. **Conclusions:** Meteorological conditions influenced DEE exposure of transporter signal workers who work outdoors. The mean EC exposure level was not high, but exposures to high concentrations of EC were recorded by meteorological factors.

Shin et al. 2020.

International Journal of Environmental Research and Public Heath, vol. 17, no. 12.

Keywords: Diesel engine exhaust; elemental carbon; occupational exposure; transporter signal work

Evidence Level: 5A

Link: https://www.mdpi.com/1660-4601/17/12/4398

The association between occupational exposure to silica and risk of developing rheumatoid arthritis: A meta-analysis

Background: Rheumatoid arthritis (RA) is an autoimmune disease with systemic inflammatory arthritis. This meta-analysis was conducted to examine the association between occupational exposure to silica and the risk of developing RA among different workers. **Methods:** In this meta-analysis, we searched relevant published studies using major electronic databases including Scopus, PubMed, ISI Web of Science, and Google Scholar search engine up to October 2019, and the references of retrieved articles were also checked for further possible sources. A random-effects model was used to account for heterogeneity among the results of the studies using the pooled odds ratios (ORs) and their 95% confidence intervals (CIs). The Q-statistic and I2 tests were calculated to assess heterogeneity between the studies. **Results:** The pooled calculation of OR indicated a significant association between occupational exposure to silica and risk of developing RA among different workers (OR = 2.59, 95% CI = 1.73 to 3.45). In addition, the pooled estimates of OR in smokers were statistically significant (OR = 2.49, 95% CI = 1.13 to 3.86). **Conclusions:** The findings of the present study reveal that occupational exposure to silica may be associated with increased risk of developing RA.

Mehri et al. 2020.

Safety Health and Work, vol. 11, no. 2.

Keywords: Meta-analysis; occupation; rheumatoid arthritis; silica exposure
Evidence Level: 1A
Link: https://www.sciencedirect.com/science/article/pii/S2093791119308741?via%3Dihub

Occupational exposure to whole-body vibrations and pregnancy complications: a nationwide cohort study in Sweden

Objectives: Pregnancy complications are common contributors to perinatal mortality and morbidity. Still, the cause(s) of gestational hypertensive disorders and diabetes are largely unknown. Some occupational exposures have been inconsistently associated with pregnancy complications, but exposure to whole-body vibrations (WBV) has been largely overlooked even though it has been associated with adverse birth outcomes. Therefore, the aim was to assess whether occupational WBV exposure during pregnancy is associated with pregnancy complications in a nationwide, prospective cohort study. **Methods:** The Fetal Air Pollution Exposure cohort was formed by merging multiple Swedish, national registers containing information on occupation during pregnancy and diagnosis codes, and includes all working women who gave birth between 1994 and 2014 (n=1 091 044). WBV exposure was derived from a job-exposure matrix and was divided into categories (0, 0.1-0.2, 0.3-0.4 and ≥0.5 m/s2). ORs with 95% CIs were calculated using logistic regression adjusted for potential confounders. **Results:** Among women working full time (n=646 490), we found increased risks of all pregnancy complications in the highest exposure group (≥0.5 m/s2), compared with the lowest. The adjusted ORs were 1.76 (95% CI 1.41 to 2.20), 1.55 (95% CI 1.26 to 1.91) and 1.62 (95% CI 1.07 to 2.46) for preeclampsia, gestational hypertension and gestational diabetes, respectively, and were similar in all sensitivity analyses. There were no clear associations for part-time workers. **Conclusions:** The results suggest that women should not be exposed to WBV at/above the action limit value of 0.5 m/s2 (European directive) continuously through pregnancy. However, these results need further confirmation.
Skroder et al. 2020.
Occupational and Environmental Medicine.

Keywords: Epidemiology; female reproductive effects and adverse pregnancy outcomes; hygiene / occupational hygiene; vibration
Evidence Level: 4B
Link: https://oem.bmj.com/content/early/2020/06/03/oemed-2020-106519

Assessment of noise exposure and hearing loss among workers in textile nill (Thamine), Myanmar: A cross-sectional study

Background: In a wide range of industries, noise-induced hearing loss remains one of the most prevalent occupational problems. This study aimed to assess the noise exposure level and associated factors of hearing loss among textile workers in Yangon Region, Myanmar. **Methods:** A cross-sectional study was conducted at a Textile mill (Thamine), Yangon Region, from April to December 2018. In total, 226 workers who were randomly selected from 3 weaving sections participated in face-to-face interviews using a structured questionnaire. A digital sound level meter and pure-tone audiometer were used for the assessment of noise exposure level and hearing loss, respectively. Logistic regression analysis was performed to assess the associated factors of hearing loss. **Results:** In total workers, 66.4% were exposed to ≥85 dB(A) of noise exposure, and the prevalence of hearing loss was 25.7%. Age ≥35 years, below high school education, hearing difficulty, tinnitus, hypertension, > 9 years of service duration in a textile mill were positively associated with hearing loss. After adjusting confounding factors, age ≥35 years (adjusted odds ratio = 6.90, 95% confidence interval = 3.45-13.82) and tinnitus (adjusted odds ratio = 2.88, 95% confidence interval = 1.13-7.37) were persistently associated with hearing loss. **Conclusion:** Providing occupational hazard education and enforcement of occupational safety regulations should be taken to decrease the noise exposure level. The regular audiometry test should be conducted for assessment of hearing threshold shift. The employer needs to implement a hearing conservation program in workplace when noise exposure reaches or exceeds 85 dB(A) for 8 hours.
Zaw et al. 2020.

Safety and Health at Work, vol. 11, no. 2.

Keywords: hearing loss; noise; protective devices; tinnitus; workplace
Evidence Level: 1B
Link: https://www.sciencedirect.com/science/article/pii/S2093791120302687?via%3Dihub

High manganese exposure decreased the risk of high triglycerides in workers: a cross-sectional study
Background: Manganese (Mn) participates in lipid metabolism. However, the associations between Mn exposure and dyslipidaemia is unclear. **Methods:** This was a cross-sectional study. Data were collected from the 2017 the Mn-exposed workers healthy cohort (MEWHC). Finally, 803 occupationally Mn-exposed workers included in the study. The workers were divided into two groups. The grouping of this study was based on Mn-Time Weighted Averages (Mn-TWA). The high-exposure group included participants with Mn-TWA greater than 0.15 mg/m3. The low-exposure group included participants with Mn-TWA less than or equal to 0.15 mg/m3. Mn-TWA levels and dyslipidaemia were assessed. **Results:** After adjustment for seniority, sex, cigarette consumption, alcohol consumption, high-fat diet frequency, medicine intake in the past two weeks, egg intake frequency, drinking tea, WHR, and hypertension, Mn-TWA levels was negatively correlated with high triglycerides (TG) risk in workers overall (OR = 0.51; 95% CI: 0.36, 0.73; $p < 0.01$). The results of males and females were consistent (OR = 0.53; 95% CI: 0.34, 0.81; $p < 0.01$) and (OR = 0.47; 95% CI: 0.24, 0.94; $p < 0.01$), respectively. By performing interactions analyses of workers overall, we observed no significant interactions among confounders. Mn-TWA levels and pack-years on high TG risk (relative excess risk for the interactions (RERI = 2.29, 95% CI: - 2.07, 6.66), (RERI) = 2.98, 95% CI: - 2.30, 8.26). Similarly, smoking status, drinking status, high-fat diet frequency, and Waist-to-Hip Ratio (WHR) showed non-significant interactions with Mn-TWA levels on high TG risk. **Conclusions:** This research indicates that high Mn exposure was negatively related to high TG risk in workers.
Lou et al. 2020.
BMC Public Health, vol. 20, no. 1.

Keywords: Dyslipidaemia; Mn; occupation; Triglycerides
Evidence Level: 4A
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09011-x

Occupational lead exposure and brain tumors: Systematic review and meta-analysis
Background: Due to inconsistencies in epidemiological findings, there has been uncertainty regarding the association of lead compounds with brain tumors. We performed a meta-analysis of published case-control and cohort studies exploring lead compound exposure and brain tumor risk. **Methods:** We searched PubMed, Embase®, and Cochrane to find eligible studies. Eighteen studies were selected for assessment of occupational exposure to lead compound and brain tumor. Pooled estimates of odds ratios (ORs) were obtained using random effects models. We assessed the differences through subgroup analysis according to tumor type, study design, measurements of exposure, and tumor outcome. Statistical tests for publication bias, heterogeneity, and sensitivity analysis were applied. **Results:** Our systematic review and meta-analysis showed a not significant association with lead exposure and risk of benign and malignant brain tumors (pooled OR = 1.11, 95% Confidence Interval (CI): 0.95-1.29). Including only malignant brain tumors, the risk of brain tumor was significantly increased (pooled OR = 1.13, 95% CI: 1.04-1.24). **Conclusions:** This meta-analysis provides suggestive evidence for an association between lead compound exposure and brain tumor. In future studies, it will be necessary to identify the effect of lead compounds according to the types of brain tumor.
Ahn et al. 2020.
International Journal of Environmental Research and Public Health, vol. 17, no. 11.

Keywords: Brain tumor; carcinogen; lead compound; meta-analysis
Evidence Level: 1A
Link: https://www.mdpi.com/1660-4601/17/11/3975

Sedentary Practices

It is time to have rest: How do break types affect muscular activity and perceived discomfort during prolonged sitting work

Background: Prolonged sitting at work can lead to adverse health outcomes. The health risk of office workers is an increasing concern for the society and industry, with prolonged sitting work becoming more prevalent. **Objective:** This study aimed to explore the variation in muscle activities during prolonged sitting work and found out when and how to take a break to mitigate the risk of muscle symptoms. **Methods:** A preliminary survey was conducted to find out the prevalence of muscle discomfort in sedentary work. Firstly, a 2-h sedentary computer work was designed based on the preliminary study to investigate the variation in muscle activities. Twenty-four participants took part in the electromyography (EMG) measurement study. The EMG variations in the trapezius muscle and latissimus dorsi were investigated. Then the intervention time was determined based on the EMG measurement study. Secondly, 48 participants were divided into six groups to compare the effectiveness of every break type (passive break, active break of changing their posture, and stand and stretch their body with 5 or 10 mins). Finally, data consisting of EMG amplitudes and spectra and subjective assessment of discomfort were analyzed. **Results:** In the EMG experiment, results from the joint analysis of the spectral and amplitude method showed muscle fatigue after about 40 mins of sedentary work. In the intervention experiment, the results showed that standing and stretching for 5 mins was the most effective break type, and this type of break could keep the muscles' state at a recovery level for about 30-45 mins. **Conclusions:** This study offers the possibility of being applied to office workers and provides preliminary data support and theoretical exploration for a follow-up early muscle fatigue detection system.

Ding et al. 2020.
Safety and Health at Work, vol. 11, no. 2.

Keywords: Intervention; JASA method; muscle discomfort; office ergonomics; surface EMG
Evidence Level: 3A
Link: https://www.sciencedirect.com/science/article/pii/S2093791119307875?via%3Dihub

The office work and stretch training (OST) study: An individualized and standardized approach to improve the quality of life in office workers

In the context of workplace health promotion, physical activity programs have been shown to reduce musculoskeletal diseases and stress, and to improve the quality of life. The aim of this study was to examine the effects of using the "five-Business" stretch training device for office workers on their quality of life. A total of 313 office workers (173m/137f) participated voluntarily in this intervention-control study with an average age of 43.37 ± 11.24 (SD) years, 175.37 ± 9.35 cm in height and 75.76 ± 15.23 kg in weight, with an average BMI of 24.5 ± 3.81 kg/m2. The participants completed the stretch training twice a week for approximately 10 minutes for a duration of 12 weeks. The SF-36 questionnaire was used to evaluate the effectiveness of the intervention at baseline and after 12 weeks. Significantly improved outcomes in mental sum score ($p = 0.008$), physical functioning ($p < 0.001$), bodily pain ($p = 0.01$), vitality ($p = 0.025$), role limitations due to physical problems ($p = 0.018$) and mental health ($p = 0.012$) were shown after the stretching training. The results suggest that a 12-week stretching program for office desk workers is suitable to improve significantly their health-related quality of life.

Holzgreve et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 12.

Keywords: Five-Konzept; SF-36; musculoskeletal disorders; occupational health; quality of life; stretching; workplace health promotion
Evidence Level: 5A
Link: https://www.mdpi.com/1660-4601/17/12/4522

Taking a stand for office-based workers' mental health: The return of the microbreak
There is evidence that movement-based microbreaks can improve the cardiovascular health of desk-based employees, but their effect on mood states is yet to be investigated. As daily work tasks can potentially result in the loss of physical and psychological resources, the objective of this study was to measure the effect of movement microbreaks during formal work time on mood states. In a randomized-controlled pilot study with repeated measures (baseline, post-test, washout) of self-reported job stress and mood states (fatigue and vigor), police officers (N = 43) were exposed to movement microbreaks during work hours. A multivariate significant difference between groups was noted after the intervention period. Further analysis revealed that the experimental group reported a latent reduction in job-related stress after the 3-months washout period. Although the study was conducted with a small sample, our preliminary findings suggest that interrupting sedentary work with movement microbreaks may have beneficial effects on employee mental health. The implications of movement microbreaks for mitigating work-related stress of first responders, including police, is discussed, along with directives for future research.
Mainsbridge et al. 2020.
Frontiers of Public Health, vol. 8, no. 215.

Keywords: Fatigue; mental health; microbreaks; occupational health; prolonged sitting; stress; vigor
Evidence Level: 2A
Link: https://www.frontiersin.org/articles/10.3389/fpubh.2020.00215/full

Physical Activity

Effectiveness of a progressive resistance exercise program for industrial workers during breaks on perceived fatigue control: a cluster randomized controlled trial
Background: There is strong evidence that physical exercise in the workplace is effective for reducing workers' musculoskeletal complaints. Studies with industrial workers and studies on progressive resistance exercises during breaks are scarce. Our aim was to evaluate the effects of a resistance exercise program on perceived fatigue control among industrial workers. **Methods:** 204 employees from the dairy industry were allocated to two groups, the intervention group (IG) (n = 98) and the control group (CG) (n = 106). The primary outcome measures were perceived fatigue control and maximum muscle strength, measured through the Need for Recovery Scale and one-repetition maximum contraction (1-RM), respectively. Secondary outcome measures were musculoskeletal complaints, physical activity level, perceived risk factors, physical fitness (BMI, vital signs, and body fat percentage), and workers´ productivity. All outcomes were assessed at baseline and then again after 4 months. The IG performed resistance exercises using progressively greater loads while the CG performed general exercise using elastic bands. The exercise protocols were performed three times per week for 20 min. An intention-to-treat analysis was performed using the mixed linear model. Results were considered significant when $p < 0.05$. **Results:** The IG did not show to be superior to the CG, although both groups improved perceived fatigue control and muscle strength after the resistance physical exercise program in the worplace. There was also no significant difference between the groups for musculoskeletal complaints and other secondary variables analyzed. However, both groups showed significant improvements between baseline and after 4 months of intervention for all evaluated outcomes ($p < 0.05$). **Conclusion:** The implementation of a progressive resistance exercise program during work breaks for perceived fatigue control was no more effective than exercises using elastic bands. However, resistance exercises during work breaks presented better results on all measured outcomes regardless of the exercise protocol used.
Santos et al. 2020.
BMC Public Health, vol. 20, no. 1.

Keywords: Employees; health promotion; occupational health; physical activity
Evidence Level: 2A
Link: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08994-x

Musculoskeletal Health

Effect of partial sick leave on sick leave duration in employees with musculoskeletal disorders
Objective: This study determined if partial sick leave was associated with a shorter duration of sick leave due to musculoskeletal disorders (MSD) based on routinely collected health data in Dutch sick-listed employees. Furthermore, the effect of timing of partial sick leave on sick leave duration was determined. **Methods:** This cohort study consisted of 771 employees with partial sick leave and 198 employees with full-time sick leave who participated in an occupational health check, and had sick leave due to MSD for minimally 4 weeks and were diagnosed by an occupational physician. Multivariable linear regression models were performed to determine the effects of partial sick leave (unadjusted and adjusted for confounders and MSD diagnosis) and Kaplan-Meier curves were presented for visualization of return to work for different timings of starting partial sick leave. Furthermore, linear regression analysis were done in subsets of employees with different minimal durations of sick leave to estimate the effects of timing of partial sick leave. **Results:** Initial results suggest that partial sick leave was associated with longer sick leave duration, also when adjusted for confounders and sick leave diagnosis. Secondary results which accounted for the timing of partial sick leave suggest that partial sick leave had no effect on the duration of sick leave. **Conclusion:** Partial sick leave does not influence MSD sick leave duration in this study when accounting for the timing of partial sick leave.
Bosman et al. 2020.
Journal of Occupational Rehabilitation, vol. 30, no. 2.

Keywords: Musculoskeletal disorders; occupational health practice; partial sick leave; return to work; sickness absence
Evidence Level: 4A
Link: https://link.springer.com/article/10.1007/s10926-019-09864-z

The bilaterality of idiopathic carpal tunnel syndrome among manual workers
Objectives: To evaluate: a) the prevalence of bilateral idiopathic carpal tunnel syndrome (CTS) in manual workers; b) a correlation between the duration of unilateral and bilateral CTS symptoms; c) a correlation between the onset of CTS symptoms in the unilateral dominant/non-dominant hand and the time of developing bilateral CTS; and d) findings of the nerve conduction study (NCS) in symptomatic and asymptomatic hands of patients with unilateral CTS. **Material and methods:** Clinical and neurophysiological examinations were conducted along with a detailed analysis of job exposure of 332 manual workers admitted to the Occupational Medicine Department, the Nofer Institute of Occupational Medicine, with suspected occupational CTS. Eventually, 258 patients were excluded from the study: 34 with associated neuropathies and 206 with other conditions potentially associated with CTS. Cases with work-related CTS (18) were also excluded. **Results:** A total of 74 patients were diagnosed as idiopathic CTS. In idiopathic CTS, the right hand was affected in 15 (20.3%) patients, the left hand in 4 (5.4%) patients, and both hands in 55 (74.3%) patients. Symptoms duration was longer in the patients with bilateral CTS (4.01 years) than in those with a unilateral right (1.7 years, p = 0.002) or left hand condition (2.8 years, p = 0.313). Median nerve impairment at the wrist was revealed by NCS in 6 left and 2 right asymptomatic hands. **Conclusions:** The findings of the study indicate the need for "alerting" patients with unilateral CTS about the risk of the disease developing in the contralateral hand. Therefore, NCS should be routinely performed in the asymptomatic hands of patients with unilateral CTS, which is essential for the prevention of neuropathies, especially among manual workers performing repetitive manual tasks.
Lewanska et al. 2020.
International Journal of Occupational Medicine and Environmental Health, vol. 33, no. 2.

Keywords: CTS; bilaterality; carpal; idiopathic; syndrome; carpal tunnel
Evidence Level: 4A
Link: http://ijomeh.eu/The-bilaterality-of-idiopathic-carpal-tunnel-syndrome-among-manual-workers,113679,0,2.html

Work ability and percentage of hours worked related to limitations in patients with upper extremity musculoskeletal disorders: a cross-sectional cohort study

Background: The aim of this study was to assess the relationship between self-reported work ability and hours worked at the current time in Upper Extremity Musculoskeletal Disorders (UEMSD) patients. To further investigate this relationship, the association of work ability and working hours with several limitations in daily and working life were explored. **Methods:** In this cross-sectional cohort study, a questionnaire was sent out to members of the UEMSD patient organisation, containing self-reported work ability, questions on working hours and limitations in work due to UEMSD. Limitations were measured with the Disabilities of Arm Shoulder and Hand questionnaire, ShortForm-36 subscales, and common hand grasps or grips. Work ability was measured with the work ability score, while worked hours were operationalised as the percentage of hours worked compared to fulltime. The correlation between worked hours and work ability was tested with the Pearson correlation coefficient. Variance in work ability and the hours worked were explained by limitations and assessed with two linear regression analyses. **Results:** Based on data of 794 respondents a moderate correlation was found between work ability and worked hours r = 0.46; 95% CI [0.40, 0.53]. Models including limitations explained 52 and 21% of total variance in work ability and worked hours, respectively. Variance in both can be explained by the degree of difficulties performing daily activities at work, limitations in daily activities as a consequence of health issues and the ability to perform a precision grip. Additionally, work ability can be explained by limitations at work and other daily activities due to physical health issues, while the percentage of hours can additionally be explained by the ability to grasp a large object with one hand, the ability to use a keyboard, and the subject's gender. **Conclusions:** The number of worked hours does not fully match the work ability. Although they share three predictors, work ability and worked hours seem to be based on different aspects. Compared to work hours, work ability is more strongly related to limitations in daily activities and work. Taking self-reported work ability into account can improve the fit between work limitations and work hours.

Schaaijk et al. 2020.
BMC Musculoskeletal Disorders, vol. 21, no. 1.

Keywords: Functioning; limitations; repetitive strain injury (RSI); UEMSD; WRUED; work ability appraisal; working hours
Evidence Level: 4A
Link: https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-020-03387-y

Risk of transition from occasional neck/back pain to long-duration activity limiting neck/back pain: a cohort study on the influence of poor work ability and sleep disturbances in the working population in Stockholm County

Objectives: The prevalence of neck/back pain (NBP) is high worldwide. Limited number of studies have investigated workers with occasional NBP regarding the risk of developing long-duration activity limiting NBP (LNBP). The objectives were to assess (1) the effect of poor work ability and sleep disturbances in persons with occasional NBP on the risk of LNBP, and (2) the interaction effect of these exposures. **Design:** Cohort study based on three subsamples from the Stockholm Public Health Cohort. **Settings:** The working population in Stockholm County. **Participants:** Persons aged 18-60 years, reporting occasional NBP the past 6 months at baseline year 2010 (n=16 460). **Measures:** Work ability was assessed with items from the Work Ability Index, perceived mental and/or physical work ability. Sleep disturbances were self-reported current mild/severe disturbances. The outcome in year 2014 was reporting NBP the previous 6 months, occurring ≥couple of days per week and resulting in decreased work ability/restricted other daily activities. The additive effect of having both poor work ability and sleep disturbances was modelled with a dummy variable, including both exposures. Poisson log-linear regression was used to calculate risk ratios (RRs) and 95% CIs. **Results:** At follow-up, 9% had developed LNBP. Poor work ability and sleep disturbances were independent risk factors for LNBP; adjusted RR 1.7 (95% CI: 1.4 to 2.0) and 1.4 (95% CI: 1.2 to 1.5), respectively. No additive interaction was observed. **Conclusion:** Workers with occasional NBP who have poor work ability and/or sleep disturbances are at risk of developing LNBP. Having both conditions does not exceed additive risk.

Holm et al. 2020.

BMJ Open, vol. 10, no. 6.

Keywords: Epidemiology; musculoskeletal disorders; occupational & industrial medicine
Evidence Level: 4A
Link: https://bmjopen.bmj.com/content/10/6/e033946.long

Covid - 19

Crafting jobs for occupational satisfaction and innovation among manufacturing workers facing the COVID-19 crisis
China's manufacturing employees are confronted with unprecedent occupational and innovation challenges caused by the ongoing COVID-19 crisis coupled with the pressure of being replaced by digital technologies. To gain a better understanding of the rising occupational uncertainty during this critical time, based on the job demands-resources (JD-R) theory, we examined the associations of employees' job crafting behaviors (JCB) with their occupational satisfaction and innovation workplace behavior (IWB), as well as the mediating effect of work engagement on the above relationships. The final usable data were obtained from the formal survey of 311 employees of six manufacturing companies that have returned to work amid COVID-19. Structural equation modelling was adopted to analyze the data. Results show that employees' JCB strengthens their occupational satisfaction and IWB via work engagement. Theoretically, our research enriches the existing body of knowledge about JCB from a cross-disciplinary angle integrating the perspectives of career and psychology. Practically, we offer valuable first-hand evidence about how manufacturing employees conducted JCB to re-orient their careers and to innovate in the face of the high unemployment situation.
Ren et al. 2020.
International Journal of Environmental Research and Public Heath, vol. 17, no. 11.

Keywords: COVID-19; China; innovation; job crafting; occupational satisfaction
Evidence Level: 5B
Link: https://www.mdpi.com/1660-4601/17/11/3953

Opening the workplace after COVID-19: What lessons can be learned from return-to-work research?
The on-going COVID-19 crisis has had an unprecedented effect on workplaces across the globe. The extent of viral infection, illness, and fatalities has transformed or closed many workplaces and resulted in large numbers of temporarily furloughed or unemployed workers. Those most susceptible to the virus and its effects are the elderly or medically vulnerable, but physical distancing, stay-at-home orders, and isolation have produced drastic social, economic and health consequences for workers of all ages, with a disproportionate impact on those more disadvantaged. Some businesses and workplaces are beginning to reopen, albeit under extraordinary rules pertaining to physical distancing, personal protective equipment, and physical guards. The efficacy of such measures in the workplace are unknown, and we have much to learn about how workers adapt and function under these circumstances.
Shaw et al. 2020.
Journal of Occupational Rehabilitation.

Keywords: Workplace; reopening; COVID-19; lessons; return to work; research
Evidence Level: 6A
Link: https://link.springer.com/article/10.1007%2Fs10926-020-09908-9

An integrative total worker health framework for keeping workers safe and healthy during the COVID-19 pandemic
Objective: The aim was to recommend an integrated Total Worker Health (TWH) approach which embraces core human factors and ergonomic principles, supporting worker safety, health, and well-being during the COVID-19 pandemic. **Background:** COVID-19 has resulted in unprecedented challenges to workplace safety

and health for workers and managers in essential businesses, including healthcare workers, grocery stores, delivery services, warehouses, and distribution centers. Essential workers need protection, accurate information, and a supportive work environment with an unwavering focus on effective infection control. **Method:** The investigators reviewed emerging workplace recommendations for reducing workers' exposures to the novel coronavirus and the challenges to workers in protecting their health. Using a theoretical framework and guidelines for integrating safety and health management systems into an organization for TWH, the investigators adapted the framework's key characteristics to meet the specific worker safety and health issues for effective infection control, providing supports for increasing psychological demands while ensuring a safe work environment. **Results:** The recommended approach includes six key characteristics: focusing on working conditions for infection control and supportive environments for increased psychological demands; utilizing participatory approaches involving workers in identifying daily challenges and unique solutions; employing comprehensive and collaborative efforts to increase system efficiencies; committing as leaders to supporting workers through action and communications; adhering to ethical and legal standards; and using data to guide actions and evaluate progress. **Conclusion:** Applying an integrative TWH approach for worker safety, health, and well-being provides a framework to help managers systematically organize and protect themselves, essential workers, and the public during the COVID-19 pandemic. **Application:** By using the systems approach provided by the six implementation characteristics, employers of essential workers can organize their own efforts to improve system performance and worker well-being during these unprecedented times.

Dennerlein et al. 2020.
Human Factors.

Keywords: Total Worker Health; coronavirus; human factors and ergonomics; safety management systems
Evidence Level: 6A
Link: https://journals.sagepub.com/doi/full/10.1177/0018720820932699