



Emerging Evidence Alert April 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 March 2020 only.

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COVID-19: challenges of working from home

The COVID-19 pandemic has made working from home the new normal for many employees. The vast majority of teams and organisations are now working remotely. After numerous weeks in isolation, to what extent has working from home affected individual and team performance?

A [recent study](#) examined the impact of working from home and the potential influence engagement has on performance and work outcomes. The study looked at survey data from nine European countries and over 11,000 employees to better understand engagement and interaction between teams working from home.

This research found that working from home can make knowledge sharing and managing team performance more challenging. Employees were more likely to rely on their individual skills and knowledge in isolation from their colleagues, and managers felt they had less control over performance and work outcomes.

The study noted that employers can support managers with training and education, and developing working from home policies and procedures. Additionally, a critical element to improving team performance was the use of technology to facilitate team cooperation and knowledge sharing.

Comcare resources: working from home

There are a range of ways managers can help employees overcome the challenges associated with working from home. You can set your team up for success by providing structure, clear expectations and a work environment that is safe and digitally connected.

Many employees at home are now also juggling the demands of continued caring arrangements that may include children, parents or other family or friends. In addition to the release of the [Working from home checklist](#), Comcare, in collaboration with the Australian Public Service Commission and Department of Industry, Science, Energy and Resources, has also released a [Guidance for Parents and Carers](#). This guidance encourages workers to be flexible while working from home to ensure they maintain a positive work-life balance.

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

Comcare website: [Coronavirus](#)

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

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

Description of evidence levels definitions used in this review

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

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

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

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

Fostering Work Participation

Return to Work

Returning to work after a hand injury: Does ethnicity matter?

Background: Hand injuries (HI) are common and may limit participation in work. The objective of this study is to examine the effect of ethnicity and other prognostic variables on return-to-work (RTW) among male manual workers after acute HI. **Methods:** A cohort of 178 subjects (90 Arabs, 88 Jews) aged 22 to 65 was studied. Trained bilingual occupational therapists evaluated and interviewed the subjects, using structured validated questionnaires for evaluating personal and environmental factors, body function and structure, and activity limitation and participation restrictions. Employment status 3 months post injury was assessed by a telephone interview. To establish a predictive model for RTW, ethnicity and certain variables of the four domains mentioned above were analysed using logistic regression analysis. **Results:** A significant difference in the rate of RTW between Jews and Arabs was found (45.5% for Jews, 28.9% for Arabs, $p = 0.03$) three months post HI. In the univariate regression analysis, ethnicity was associated with RTW (OR = 2.05; CI: 1.10-3.81) for Jews vs. Arabs. Using a multivariate analysis, only legal counselling, educational attainment, and the severity of disability were significantly associated with RTW. **Conclusion:** RTW three months post HI among manual workers is directly related to variables such as education and legal counselling and only indirectly related to ethnicity. Patients with a lower level of education and those who were engaged in legal counselling need special attention and close guidance in the process of RTW.

Marom et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Hand injuries; Return to work; Ethnicity; Return to work

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0229982>

Implementation of a novel return-to-work approach for persons with affective disorders in a traditional vocational rehabilitation context: a case study

Background: The person-centred Individual Enabling and Support (IES) model is a novel return-to-work (RTW) intervention for people with affective disorders that was developed from evidence-based supported employment for persons with severe mental illness. Typically, supported employment is integrated into mental healthcare and provides a network around the service user and close collaboration with employment and insurance services and employers. Introducing integrated models into a highly sectorised welfare system that includes traditional mental healthcare and vocational rehabilitation is challenging. Greater knowledge is needed to understand how facilitating or hindering factors influence this introduction. The aim of this study was to investigate essential components in implementation of the IES model. **Methods:** A case-study was conducted and included four mental healthcare services. Data collection was comprised of semi-structured interviews with 19 key informants, documentation from meetings, and reflection notes. Analyses were performed according to directed content analysis, using the components of the Consolidated Framework of Implementation Research (CFIR) as a guiding tool. Fidelity assessments were performed at 6 and 12 months. **Results:** Anticipating RTW support for the target group and building collaborative relationships and a network with employment specialists that engaged staff in every organization were components that resulted in the greatest facilitation if IES implementation. Barriers consisted of difficulty in integrating employment specialists into the mental healthcare teams, insufficient engagement of first line managers, reorganization and differing perceptions of the IES model fit into a traditional vocational context. Delivery of the IES model had good fidelity. **Conclusions:** The IES model can be implemented with good fidelity, several model advantages, and context adaptation. Team integration difficulties and negative perceptions of model fit in a traditional vocational rehabilitation context can be overcome to a certain degree, but this is insufficient for sustainable implementation on a larger scale. Policy and guidelines need to promote integrative and person-centred RTW approaches rather than a segregated stepwise approach. Further implementation studies in the traditional vocational rehabilitation context are needed.

Johanson et al. 2020.

International Journal of Mental Health Systems.

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Keywords: Affective disorders; Implementation; Mental healthcare service; Return to work; Supported employment; Traditional vocational rehabilitation

Evidence Level: 5A

Link: <https://ijmhs.biomedcentral.com/articles/10.1186/s13033-020-00355-w>

Prognostic factors for medical and productivity costs, and return to work after trauma

Aim: The aim of this study was to determine prognostic factors for medical and productivity costs and return to work (RTW) during the first two years after trauma in a clinical trauma population. **Methods:** This prospective multicentre observational study followed all adult trauma patients (≥ 18 years) admitted to a hospital in Noord-Brabant, the Netherlands from August 2015 through November 2016. Health care consumption, productivity loss and return to work were measured in questionnaires at 1 week, 1, 3, 6, 12 and 24 months after injury. Data was linked with hospital registries. Prognostic factors for medical costs and productivity costs were analysed with log-linked gamma generalized linear models. Prognostic factors for RTW were assessed with Cox proportional hazards model. The predictive ability of the models was assessed with McFadden R² (explained variance) and c-statistics (discrimination). **Results:** A total of 3785 trauma patients (39% of total study population) responded to at least one follow-up questionnaire. Mean medical costs per patient (€9,710) and mean productivity costs per patient (€9,000) varied widely. Prognostic factors for high medical costs were higher age, female gender, spine injury, lower extremity injury, severe head injury, high injury severity, comorbidities, and pre-injury health status. Productivity costs were highest in males, and in patients with spinal cord injury, high injury severity, longer length of stay at the hospital and patients admitted to the ICU. Prognostic factors for RTW were high educational level, male gender, low injury severity, shorter length of stay at the hospital and absence of comorbidity. **Conclusions:** Productivity costs and RTW should be considered when assessing the economic impact of injury in addition to medical costs. Prognostic factors may assist in identifying high cost groups with potentially modifiable factors for targeted preventive interventions, hence reducing costs and increasing RTW rates.

de Munter et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Medical costs; Productivity costs; Return to work; Trauma; Clinical trauma population

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230641>

Presenteeism and Absenteeism

Ill health and distraction at work: Costs and drivers for productivity loss

Employer-sponsored health insurance is the most widely spread form of medical coverage in the United States. Substantial portion of the premiums' costs is covered by employers, thus contributing to labor costs for organizations. Although worker health and well-being have become increasingly important for businesses, most of them do not see a direct link between their health and well-being investments and work output and quality of work of their employees. This study aimed to estimate the cost of inefficiencies at work with emphasis on their internal causes, i.e., sick-related absenteeism and distraction at work. With data from 3,258 employees (2,775 office and 483 manufacturing) from a major US manufacturer with revenue of \$6 billion, monetary loss in productivity due to sick-related absenteeism and distraction among office and factory floor employees was assessed. The Work Productivity and Activity Impairment scale and the Health-related Lost Productivity Time tool (both already validated) were used to estimate the cost of productivity loss. Survey data on health-related absenteeism and distraction time at work, together with company pay records, were used. A secondary analysis, using survey data collected from 615 Polish apparel factory workers at a major global brand complemented with their payroll records (absenteeism and salary), was conducted to validate the main findings. Results of the primary analysis indicated that annual productivity loss to the organization amounted to approximately \$300 m. Distraction contributed to 93.6%

of the annual productivity loss of the US manufacturer, while only 6.4% resulted from health-related absenteeism, implying that distraction at work cost this organization almost 15 times more than health related absenteeism, reducing the overall return on sales by over 6 pp. The secondary analysis corroborated the dominance of distraction induced productivity costs over the cost of health-related absenteeism. Evidence from the regression analysis conducted on cross-sectional data indicated that regardless of the type of work, work engagement and auditory privacy were evidently highly bound with productivity loss. For manufacturing workers, job security was also negatively correlated with productivity loss, while for office employees, better social relationships and lack of work-family conflict were positively associated with productivity. Despite being based on two case studies, our results are informative of the magnitude of distraction and health related productivity costs. They also show that workers with deficiencies in their well-being at work present a substantial opportunity for growth to companies in terms of reduced efficiency.

Bialowolski et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Ill health; Distraction; Productivity loss

Evidence Level: 5B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230562>

Effectiveness of workplace interventions for improving absenteeism, productivity, and work ability of employees: A systematic review and meta-analysis of randomized controlled trials

To determine the effectiveness of workplace interventions and the most effective methodological design for the improvement of employee productivity, work ability, and absenteeism. A meta-analysis of randomized controlled trials (RCTs) of workplace interventions was conducted (PROSPERO, CRD42018094083). The PubMed, Scopus, PsycINFO, and Cochrane databases were searched. RCTs from 2000 to 2017 and with employees (18-65 years) were selected. Then, intervention characteristics and work-related outcomes data were extracted. A total of 47 RCTs were included in the systematic review, and 19 RCTs (11 absenteeism, 7 productivity, and 5 work ability) were included in the meta-analysis. The meta-analysis showed that the effectiveness of workplace interventions for absenteeism was -1.56 (95% CI, -2.67 to -0.44) and -2.65 (95% CI, -4.49 to -0.81) considering only moderate quality RCTs. In contrast, only a few studies of workplace interventions for productivity and work ability were included, which was insufficient for determining the effectiveness and best design for improving these work outcomes. The workplace is an interesting environment to reduce absenteeism, and individualized and counseling interventions with <10 sessions/total were the most effective workplace intervention methodological design for reducing the absenteeism of employees. Future high-quality RCTs that also consider health risks should be implemented to strengthen the results.

Tarro et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Absenteeism; Employees; Performance; Productivity; Work ability; Workplace intervention

Evidence Level: 1A

Link: <https://www.mdpi.com/1660-4601/17/6/1901>

Weight change among normal weight, overweight and obese employees and subsequent diagnosis-specific sickness absence: A register-linked follow-up study

Aims: Obesity and weight change are associated with sickness absence; however, less is known about the diagnoses for sickness absence. We examined the association between stable and changing weight by body mass index groups with sickness absence due to any, musculoskeletal and mental diagnoses among midlife female and male employees. **Methods:** The Finnish Helsinki Health Study phase 1 survey took place in 2000-2002 (response rate 67%) and phase 2 in 2007 (response rate 83%). Based on self-reported body mass index, we calculated the weight change between phases 1 and 2 (body mass index change $\geq 5\%$). The data were linked with registers of the Social Insurance Institution of Finland, including information on diagnoses (ICD-10) for sickness absence >9 days. We used a negative binomial model to examine the association with sickness absence among 3140 women and 755 men during the follow-up (2007-2013). Results are

presented as rate ratios. Covariates were age, sociodemographic factors, workload, health behaviors and prior sickness absence. **Results:** Weight-gain (rate ratio range=1.27-2.29), overweight (rate ratio range=1.77-2.02) and obesity (rate ratio range=2.16-2.29) among women were associated with a higher rate of sickness absence due to musculoskeletal diseases, compared to weight-maintaining normal-weight women. Similarly, obesity among men was associated with sickness absence due to musculoskeletal diseases (rate ratio range=1.55-3.45). Obesity among women (rate ratio range=1.54-1.72) and weight gain among overweight men (rate ratio=3.67; confidence interval=1.72-7.87) were associated with sickness absence due to mental disorders. **Conclusions:** Obesity and weight gain were associated with a higher rate of sickness absence, especially due to musculoskeletal diseases among women. Preventing obesity and weight gain likely helps prevent sickness absence.

Svärd et al. 2020.

Scandinavian Journal of Public Health, vol. 48, no. 2.

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Keywords: Body mass index; Longitudinal studies; Obesity; Register data; Sickness absence

Evidence Level: 4B

Link: https://journals.sagepub.com/doi/full/10.1177/1403494818802990?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed

Working Hours

Association of overtime work hours with various stress responses in 59,021 Japanese workers:

Retrospective cross-sectional study

This study aims to clarify the relationships between length of overtime work and various stress responses using large-scale cross-sectional data of Japanese workers. This study's participants are 59,021 Japanese workers in 117 companies. Data was collected by self-reporting questionnaire. The Brief Job Stress Questionnaire was used to measure stress responses on six scales (i.e. "lack of vigor", "irritability", "fatigue", "anxiety", "depression", and "somatic responses"). Length of overtime work hours were classified as 0-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, and >80 hours/month. Multiple linear regression analyses were used to examine the association of stress responses with overtime while adjusting all possible confounders. In result, workers with longer overtime showed significantly higher "irritability", "fatigue", "anxiety", "depression", and "somatic responses" for both genders (p-for-trend <0.001), however, length of overtime was negatively associated with "lack of vigor" among men (p-for-trend <0.001). Men with 61-80 hours of overtime showed high fatigue with high vigor at the same time. Length of overtime was linearly associated with various stress responses, except for "lack of vigor". Length of overtime shows linear associations with various psychosomatic stress responses. However, "lack of vigor" was not consistently associated with overtime. Male workers with 61-80 hours of monthly overtime were more likely to feel vigorous than workers with shorter overtime. However, potential longterm effects of such extreme overtime should not be underestimated and must be paid attention to.

Kikuchi et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Overtime; Stress responses; Japanese, Working hours

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0229506>

Building Employer Capability

Wellness Programs

Feasibility and effectiveness of a workplace-adapted mindfulness-based programme to reduce stress in workers at a private sector logistics company: An exploratory mixed methods study

There is a high prevalence of stress in the logistics sector owing to very demanding, fast-paced and unpredictable tasks. Mindfulness-based programmes may reduce stress but require considerable practice. Our aim was to evaluate the feasibility and effectiveness of a shortened, workplace-adapted mindfulness-based programme for the logistics sector (WA-MBP-LS) for the purpose of reducing stress. A nonblinded, nonrandomised, two-arm controlled trial was conducted. The WA-MBP-LS (n = 32) consisted of six weekly 90-min mindfulness sessions. The control group (n = 36) attended a psycho-educational seminar. The Perceived Stress Scale (PSS) and Five Facets of Mindfulness Questionnaire (FFMQ) were measured at pretest, posttest and 6-month follow-up. Differences between groups were evaluated using mixed-effects models. Qualitative methods were used to analyse implementation issues. A 64.2% reduction was observed between initial volunteers and actual participants. Attrition at six-month follow-up was 45.6%. Participants attended a median of five sessions. Decreases in PSS favoured the WA-MBP-LS group at posttest and follow-up. FFMQ played a mediating role in PSS reductions. Barriers were disinterest, lack of programming, work overload and absences from work. Facilitators were curiosity, timing, company facilities and audio recordings. The WA-MBP-LS was feasible and effective in reducing stress, but more efforts to improve the practicalities of implementation are desirable.

Montero-Marin et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: WA-MBP-LS; Feasibility; Logistics sector; Mindfulness; Stress; Workplace

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/5/1643>

Lifestyle interventions in the maritime settings: a systematic review

Background: Evidence on workplace health promotion interventions at sea is scattered and includes different methodological approaches. The continued focus on lifestyle and health promotion on land-based industries makes it pertinent to evaluate available data from maritime settings to gain systematic knowledge on the field. **Methods:** In this systematic review, we systematically searched PubMed and NLM Gateway (for MEDLINE), Institute of Scientific Information/Web of Science (ISI/WOS), and SCOPUS up to January 2019 using standard keywords including lifestyle interventions in the maritime setting. Two independent reviewers assessed papers and extracted the data. The quality of included studies was assessed using the Cochrane Risk of Bias tool. Due to significant heterogeneity between studies, the effectiveness of interventions was presented as a qualitative synthesis. **Results:** After the initial search and refinement based on a total of 4432 records, ten articles met eligibility criteria and were included in the final review. Six studies originated from US maritime settings, 3 studies were conducted on Danish seafarers and one study came from Finland. The main focus of 6 studies was educational interventions including stress management, healthy eating, anti-smoking and anti-drinking sessions, sexual behavior program, and advice about preventive strategies. Four studies described the implementation of interventions, including micro-nutrient supplementation, physical activity, and pharmacotherapy. Follow-up assessments occurred over a time period ranging from 80 days to 2 years. Three studies found a positive though limited effect of structural and/or education interventions in maritime settings. The quality of all included studies was modest. **Conclusion:** Results of this systematic review show that a limited number of studies of lifestyle interventions in the maritime setting exist and that the quality of them is generally modest. Also, most of the interventions identified have failed to demonstrate substantial health benefits for seafarers.

Baygi et al. 2020.

Environmental Health and Preventative Medicine, vol. 25, no. 1.

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Keywords: Interventions; Maritime settings; Systematic Review

Evidence Level: 1A

Link: <https://environhealthprevmed.biomedcentral.com/articles/10.1186/s12199-020-00848-7>

Organisational Issues

Employee-organization relationships and team performance: role of team collective efficacy

Besides the previous social relationship perspective of employee-organization relationship (EOR) research, this study takes the social cognitive perspective to explore the role of team collective efficacy in mediating the relationship between EORs and team performance. This study further contends that team cohesion moderates the positive relationship between collective efficacy and team performance, thereby moderating the indirect relationship between EORs and team performance through collective efficacy. Data analyses of 231 teams in Study 1 and 63 teams in Study 2 support the hypotheses. Therefore, this study provides theoretical contributions to the EOR literature by introducing a new perspective at the team level and to the social cognitive literature by discussing a boundary condition of the effect of collective efficacy on team performance.

Li et al. 2020.

Frontiers of Psychology.

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Keywords: Collective efficacy; Employee–organization relationship; Human resource management; Team cohesion; Team performance

Evidence Level: 5A

Link: <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00206/full>

Co-workers working from home and individual and team performance

The number of firms supporting work from home has risen dramatically as advances in communication technology have fundamentally transformed the way humans cooperate. A growing literature addresses working from home, but focuses only on individual workers, overlooking potential influence of co-worker engagement. Our aim is to study the influence of co-workers working from home on individual and team performance. We use unique data from a large-scale survey involving nine European countries, 259 establishments, 869 teams and 11,011 employees to show that the impact of working from home by co-workers on performance is considerable and has remained hidden in past studies because they did not account for co-worker effects. While working from home may be useful for some workers, it does bring issues for them as well. Specifically, we demonstrate that co-workers working from home negatively impact employee performance. Moreover, team performance is worse when more co-workers are working from home.

van der Lippe et al. 2020.

New Technology, Work and Employment, vol. 35, no. 1.

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Keywords: Co-workers; Employees; Multilevel; Organisations; Performance; Working from home

Evidence Level: 4A

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7079547/>

Predisposition to change is linked to job satisfaction: assessing the mediation roles of workplace relational civility and insight

The globalization processes typical of liquid modern society require organizations to have high levels of flexibility, dynamism, and rapidity of change, testing the adaptability of workers with possible repercussions on well-being and productivity. Therefore, this study aimed to investigate the role of several psychological factors in favoring job satisfaction in a group of organizational workers (mean age = 46.24; SD = 9.99; 40.9% males and 59.1% females). Firstly, the impact of predisposition to change on job satisfaction through workplace relational civility (others with me) or insight orientation as independent mediating variables was analyzed. After that, this relationship was also studied by testing the effect that the simultaneous interaction of both mediators could have. Results show that workplace relational civility (others with me) significantly mediated the relationship between predisposition to change and job satisfaction, while no significance was found in the effect of insight when considered individually. However, the latter acquires greater relevance if placed in interaction with the other mediator, that is found to be the most proximal factor linking job satisfaction to the other more distal variables. Such findings might have a

relevant role in strengthening preventive intervening, favoring positive results for greater well-being of both subjects and organizations.

Gori et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Insight; Job satisfaction; Predisposition to change; Workplace relational civility

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/6/2141>

Measuring social capital of healthcare organizations reported by employees for creating positive workplaces - validation of the SOCAPO-E instrument

Background: In highly segmented and complex healthcare organizations social capital is assumed to be of high relevance for the coordination of tasks in healthcare. So far, comprehensively validated instruments on social capital in healthcare organizations are lacking. The aim of this work is to validate an instrument measuring social capital in healthcare organizations. **Methods:** This validation study is based on a cross-sectional survey of 1050 hospital employees from 49 German hospitals which specialize in breast cancer care. Social capital was assessed by a six-item scale. Reliability analyses and confirmatory factor analyses were conducted to determine the content validity of items within the theory-driven one-dimensional scale structure. The scale's associations with measures of the social aspects of the work environment (identification, social support, open communication climate) were estimated to test convergent validity. Criterion-related validity was evaluated by conducting structural equation modelling to examine the predictive validity of the scale with measures of work engagement, well-being and burnout. **Results:** A one-dimensional structure of the instrument could be identified (CFI = .99; RMSEA = .06). Convergent validity was shown by hypothesis-consistent correlations with social support offered by supervisors and colleagues, a climate of open communication, and employee commitment to the organization. Criterion-related validity of the social capital scale was proved by its prediction of employee work engagement ($R^2 = .10-.13$ for the three subscales), well-being ($R^2 = .13$), and burnout ($R^2 = .06-.11$ for the three subscales). **Conclusions:** The confirmed associations between social capital and work engagement, burnout as well as well-being stress the importance of social capital as a vital resource for employee health and performance in healthcare organizations. In healthcare organizations this short instrument can be used as an efficient instrument to measure the organizations' social capital.

Ansmann et al. 2020.

BMC Health Services Research, vol. 20, no. 1.

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Keywords: Burnout; Community; Organization; Social capital; Structural equation modelling; Validation; Well-being; Work engagement; Work environment

Evidence Level: 4B

Link: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-05105-9>

Job Design

Investing time and resources for work-life balance: the effect on talent retention

The study of work-life balance has undergone significant development in recent years as a result of changes in society and the growing importance of human resources (HR) for companies. Taking into account that human capital represents a critical success factor for businesses, the current context requires the development and implementation of HR management strategies aimed at attracting and retaining the most talented workers in order to obtain the expected results. The objective of this paper is to present an integrated model of work-life balance strategies, including the impacts of the different policies and practices on the retention of talented HR, which can be a basis for further academic developments on this subject, as well as a roadmap for managers. Hence, we will analyze a case study carried out in a multinational company—a leader in the technology and tourism sectors, and importantly dependent on valuable human capital, for which the HR strategy aims to improve the performance of the firm in the medium and long term through analysis, planning, and flexibility.

Rodríguez-Sánchez et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Flexibility; Retention; Talent; Training; Valuable human resources; Work–life balance

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pubmed/?term=Investing+time+and+resources+for+work-life+balance%3A+the+effect+on+talent+retention>

Occupation as a proxy for job exposures? Routine data analysis using the example of rehabilitation

Aim of the study: Job exposures are associated with health-related outcomes including sick leave and reduction in earning capacity. Rehabilitation of persons in working age aims primarily to secure or restore work capacity. Information concerning job exposures is, however, not directly available in routine data of healthcare payers. Since exposures relate to specific occupations and the current occupation is part of routine data, job exposures may be determined indirectly via job-exposure matrices (JEM). The aim of the study is to describe the possibilities and challenges of the representation of job exposures by the occupation according to routine data using the example of rehabilitation. **Methods:** The Scientific Use File 'SUFSDLV15B' of the German Pension Insurance was analysed. We used data from n=1 242 171 persons in work with at least one completed medical rehabilitation between 2008 and 2015 (dataset 1). The occupation is coded according to KldB 88 or KldB 2010 (German Classification of Occupations). In addition, data from a nationwide survey with 2530 rehabilitation patients was available (dataset 2). Job exposures are operationalized by the Job Exposure Index via JEM. The relationship to the return-to-work prognosis at the end of rehabilitation (dataset 1) and to patient reported outcome measures (dataset 2) is described.

Results: Information concerning the occupation is available for about 91% of rehabilitation measures of employed patients for the year prior to rehabilitation. At high levels of job exposures, the proportion of persons with a predicted working capacity in the last job of fewer than 3 h per day increased by a factor of 4 compared to low-level job exposures (23.5 vs. 6.1%). On the other hand, there is a low association only to reduced working capacity in the general labour market (2.9 vs. 2.4%). High-level job exposures are associated with self-reported, work-related impairments. **Conclusion:** The Job Exposure Index may offer a valid approach to depict occupation-related exposures. The index can be used in the analysis of routine data of the pension insurance and other social security funds, as well as in the linkage of individual assessment data with routine data containing the occupation, without any additional data collection effort. Due to its construction based on job classifications, it will not replace the assessment of individual burdens.

Brünger et al. 2020.

Gesundheitswesen, vol. 82.

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Keywords: Job exposure; Rehabilitation; Work capacity; Job Exposure Index

Evidence Level: 4B

Link: <https://www.thieme-connect.com/products/ejournals/abstract/10.1055/a-0965-6777>

A cross-level investigation of team-member exchange on team and individual job crafting with the moderating effect of regulatory focus

Within the framework of regulatory focus theory, this study examines the issues of job crafting. This study adopts purposive sampling as a means to collect data. A total of 123 teams with 514 members were invited to participate in the survey, and 91 teams with 354 members provided valid questionnaire responses for data analysis. Mplus 7.0 was applied to conduct data analysis and verification. Data analysis demonstrates that (1) team-member exchange (TMX) exerts a positive influence on team job crafting and individual job crafting; (2) team job crafting positively affects individual job crafting; (3) TMX can positively affect individual job crafting via team job crafting; and (4) a prevention focus has a moderated mediation effect on the indirect relationship between TMX and individual job crafting. Based on its findings, this study has both practical and theoretical implications. Academically, it can be regarded as a pioneering academic endeavor. Practically, this study can enhance teamwork, postulate job flow, and promote the quality of member relationships, thus boosting individual job crafting performance.

Hung et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Individual job crafting; Regulatory focus; Team job crafting; Team-member exchange

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/6/2044>

Effect of gig workers' psychological contract fulfillment on their task performance in a sharing economy – a perspective from the mediation of organizational identification and the moderation of length of service

Workers' isolation may occur in gig employment in the sharing economy, which generates a weak perception of the organization and unpredictable work performance. Drawing on social exchange theory, this paper proposes a framework to explore the effect of psychological contract fulfillment on gig workers' task performance from the perspective of the mediation of organizational identification and the moderation of the length of service. A total of 223 samples were recruited from Didi (a ride-hailing company in China) drivers. The results show that both transactional and relational psychological contract fulfillment can directly affect gig workers' task performance and also indirectly affect it via organizational identification. When the length of service for the current company is taken into consideration, transactional contract fulfillment, as the representation of a company's recognition of gig workers' effort, has a stronger effect on the organizational identification of gig workers who have been working for the company for less than a year compared with those who have been working for a longer period. The results show no difference in the relationship between relational psychological contract and organizational identification between the two groups. Transactional psychological contract fulfillment exhibits the same significant effect on gig workers' task performance in both groups. By contrast, relational psychological contract fulfillment has a stronger effect on long-serving Didi drivers than on those who joined the company within the year. These findings generate certain theoretical and practical implications for gig employment management in the sharing economy.

Liu et al. 2020.

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

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Keywords: Gig employment; Length of service; Organizational identification; Psychological contract fulfillment; Sharing economy; Task performance

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/7/2208>

A longitudinal study of piece rate and health: evidence and implications for workers in the US gig economy

Objectives: The objective of this study was to evaluate health outcomes for workers subject to piece rate historically to better understand the implications of pay type in the modern-day gig economy. While piece rate occurring in the 1980s and 1990s predates recent platform-based employment, it introduced and normalized patterns of economic precariousness that are instrumental in the current gig economy. Evidence suggests that such pay types may result in poor health outcomes; however, cross-sector evidence of its long-term effects on US workers is lacking. This article represents the first longitudinal cross-sector analysis relating health outcomes to this performance pay type in US workers. **Study Design:** This is a longitudinal cohort study. **Methods:** Data from six survey waves of the 1979 National Longitudinal Survey of Youth collected between 1988 and 2000 are used in a random-effects logit model to predict self-reported health limitations related to piece rate, while controlling for worker, work environment, lifestyle, time, and location trends. **Results:** Pay tied to piece rate in current or prior periods significantly increases the odds of self-reported health limitations compared with salaried work (odds ratio [OR]: 1.4-1.8). These effects are elevated for the subgroups of low-wage (OR: 1.5-1.8), female (OR: 1.8-1.9), and non-white (OR: 2.0-2.1) workers compared with their high-wage, male, and white peers. **Conclusions:** The results suggest that piece rate pay designed to promote efficiency may have important negative implications for worker health, especially for the most vulnerable members of the US workforce such as women, minority, and low-income workers. Given the growing popularity of performance-based pay to the gig economy, more research is needed to determine if the practice is justified from a public health perspective.

Davis et al. 2020.

Public Health.

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Keywords: Gig economy; Occupational health; Performance pay; Piece rate; Wages

Evidence Level: 4A

Link: <https://www.sciencedirect.com/science/article/pii/S0033350619303415?via%3Dihub>

The relationship between self-employed workers' entrepreneurial attitude and health status

In the new work environment, self-employment as a formula and entrepreneurship as an attitude have gained prominence as a means to foster a more competitive economy and increase employment opportunities. Having an entrepreneurial attitude, in addition to being positive on a work level, can also have positive effects on the health of the entrepreneur. The objective of this study is to analyze the relationship between an entrepreneurial attitude and its influence on the general health of Spanish self-employed workers who possess these skills, compared to those who lack them. A cross-sectional descriptive study was carried out through random sampling of 1148 self-employed professionals throughout Spain from 21 different economic sectors. The results show the existence of a negative relationship between entrepreneurial attitude and age, that is to say, an entrepreneurial attitude decreases with age. With the sex variable, women show less entrepreneurial attitude and with mental health, decreased mental health was shown in those with a greater entrepreneurial attitude. On the other hand, there is a positive linearity between a positive attitude and the social function of the state of health.

Climent-Rodriguez et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Engaged workers; innovative and entrepreneurial skills; Mental health; Occupational health; Occupational health promotion; Quality of working life; Work-health balance

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/6/1892>

Shift Work

Association between shift work and poor sleep quality in an Asian multi-ethnic working population: A cross-sectional study

Background: We aimed to examine the association between shift work and sleep quality in a diverse occupational type. **Methods:** This was a cross-sectional study of self-reported sleep quality in 424 workers aged ≥ 21 using the Pittsburgh Sleep Quality Index (PSQI). We divided workers into two categories based on their PSQI score: (a) ≤ 5 (good sleep quality) and (b) > 5 (poor sleep quality). We used multiple logistic regressions to assess the association between shift work and sleep quality adjusted for potential confounders. **Results:** The mean age was 39.2 (SD = 11.3) years, with shift workers being older than their counterparts. Most workers were of Chinese ethnicity (63.9%). Males were significantly more likely to undertake shift work than females (89% v 11%, p -value < 0.001), but it should be noted that the majority of workers was male (78.8%) in this sample of workers. Shift workers had a 198% increased odds of poor sleep quality compared to non-shift workers (OR = 2.98; 95% CI: 1.53-5.81). **Conclusion:** Shift work was significantly and independently associated with increased odds of poor sleep quality in this sample of workers. The present findings may inform employment guidelines and help develop workplace health promotion interventions aimed at improving sleep quality among workers and ultimately lead to a healthier workforce.

Thach et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Shift work; Sleep quality; Asian; Working population

Evidence Level: 4B

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0229693>

Energy, nutrient and food intakes of male shift workers vary according to the schedule type but not the number of nights worked

Shift work is associated with increased risk of chronic diseases due to circadian rhythm disruptions and behavioral changes such as in eating habits. Impact of type of shifts and number of night shifts on energy, nutrient and food intake is as yet unknown. Our goal was to analyze shift workers' dietary intake, eating behavior and eating structure, with respect to frequency of nights worked in a given week and seven schedule types. Eating habits and dietary intakes of 65 male shift workers were analyzed in three steps based on 365 24-h food records: (1) according to the number of nights, (2) in a pooled analysis according to schedule type, and (3) in search of an interaction of the schedule and the timing of intake. Mean nutrient and food group intake during the study period did not depend on the number of nights worked. Amount and distribution of energy intake as well as quality of food, in terms of nutrient and food groups, differed depending on the type of schedule, split night shifts and recovery day (day after night shift) being the most impacted. Shift workers' qualitative and quantitative dietary intakes varied between different schedules, indicating the need for tailored preventive interventions.

Bucher Della Torre et al. 2020.

Nutrients, vol. 12, no. 4.

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Keywords: Eating behavior; Food intake; Meal structure; Meal timing; Shift work

Evidence Level: 5A

Link: <https://www.mdpi.com/2072-6643/12/4/919>

Management and Leadership

How does servant leadership foster employees' voluntary green behavior? A sequential mediation model

Employees' voluntary green behavior (EVGB) is indispensable in realizing organizations' environmental sustainability objectives. Leaders can act as catalysts to shape the behavior of their employees. On EVGB, noticeably the missing link is investigating the influence of servant leadership and the mechanism through which it operates. Building upon self-determination and psychological empowerment theories, this research examined the impact of servant leadership on EVGB through the simple and sequential mediation of psychological empowerment and autonomous motivation for the environment (AME). Through systematic sampling, dyadic data were collected from 315 pairs of subordinates and supervisors working in the power sector organizations of Pakistan. Results were obtained by employing the partial least squares structural modeling (PLS-SEM) technique with Smart-PLS 3.2.8 software. Findings revealed that psychological empowerment and AME simply and sequentially mediate the influence of servant leadership on EVGB. Implications for theory and organizational practitioners are offered, accompanied by suggestions for future research.

Ying et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Autonomous motivation for the environment; Employees' voluntary green behavior; Psychological empowerment; Sequential mediation; Servant leadership

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/5/1792>

Total worker health leadership and business strategies are related to safety and health climates in small business

The purpose of this study was to investigate the relationship between Total Worker Health® (TWH) business strategies and employee perceptions of leadership commitment and safety and health climates. Using data from 53 small enterprises and 1271 of their workers collected as part of the Small + Safe + Well (SSWell) Study, we confirm the primacy of the relationship between leadership commitment to safety and workplace safety climate. After accounting for leadership commitment to safety, business-reported policies and practices that promote the health, safety, and well-being of workers (i.e., TWH strategies) were no longer related to safety climate. In contrast, the relationship between TWH strategies and health climate

were significantly associated with the level of small business leadership commitment to worksite wellness. Relatedly, our results demonstrate that leadership is a common correlate to both safety climate and health climate. Future research should investigate integrated TWH leadership development strategies as a means of simultaneously improving safety and health climates.

Schwatka et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Total Worker Health; Health climate; Health leadership; Occupational safety and health; Safety climate; Safety leadership; Small business leadership; Worksite wellness

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/6/2142>

Daily job crafting helps those who help themselves more: the moderating role of job autonomy and leader support

Not all members are engaged in job crafting behavior in the same context, yet little research has addressed boundary conditions of daily job crafting. This study addresses these important issues and how the effects of daily job crafting vary depending on the work situation. We consider job autonomy and leader support as between-person level moderators and reveal how it affects the impact of daily job crafting on daily job satisfaction. Through the experience of the sampling method, we collected 946 days of data from 108 members (61.9% were male and 38.1% were female) for hypothesis testing. The analysis of results showed that the main effect of daily job crafting and the cross-level moderating effect of leader support were significant, and the moderating effect of job autonomy was not significant. In particular, the positive effect of daily job crafting on daily job satisfaction was strengthened for members with low leader support. These findings highlight that leader support is an important social context in job crafting, and provides insights when members can get more advantages from their daily job crafting.

Hong et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Daily job crafting; Daily job satisfaction; Job autonomy; Leader support; Multilevel analysis

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/6/2045>

Work Ability

The level and development of unemployment before disability retirement: a retrospective study of Finnish disability retirees and their controls

A weakening work ability may lead to a higher risk of gradual exclusion from working life, which may be manifested in increasing levels of unemployment. This study examined development of unemployment prior to disability retirement by educational level and occupational class in different diagnostic groups. The study population comprised 70% of Finnish residents aged 25-64 years who retired due to disability in 2011-2015 (n = 54,387). Growth curve models were used to analyze the level and development of pre-retirement unemployment among the retirees due to mental disorders, musculoskeletal diseases and all other somatic diseases and their gender- and age-matched controls drawn from the non-retired population. During six pre-retirement years, disability retirees had on average 39 annual excess unemployment days compared to their non-retiring controls. Excess unemployment was particularly high among those retiring due to mental disorders. On average, unemployment increased by 5.5 days per each year of approaching disability retirement, after controlling for aging and secular trends. The increase was largest among those who retired due to mental disorders. Excess unemployment was higher among the less educated and among manual workers, in particular among those retiring due to mental disorders or somatic diseases other than musculoskeletal diseases. Increased efforts to maintain and improve work ability among the unemployed is crucial in diminishing disability retirement at the population level. As the level of unemployment is elevated already several years before disability retirement, work ability problems among the unemployed should be tackled in the early stages.

Laaksonen et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

User License:

Keywords: Disability retirement; Socioeconomic; Unemployment; Work ability

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/5/1756>

Development and content validity of the Abilitator: a self-report questionnaire on work ability and functioning aimed at the population in a weak labour market position

Background: The unemployed have lower work ability and poorer health than the employed. This situation deteriorates when unemployment continues. The long-term unemployed often have co-morbidities and face many other challenges. This increases the need for a multidimensional assessment of work ability and functioning in different service settings. In this study, we describe the development and analyse the content validity of the Abilitator, a self-report questionnaire on work ability and functioning for those in a weak labour market position. **Methods:** The Abilitator was developed in 2014-2017. Its construct was assessed by members of academic expert panels (n = 30), practical expert panels of professionals (n = 700) and target group clients (n = 28). The structure and the content of the questionnaire was co-developed in 29 workshops and adjusted twice based on the expert panels' feedback. The Abilitator was also implemented among target group clients (n = 3360) in different services and projects. During its development the Abilitator was linked to the International Classification of Functioning, Disability and Health (ICF). The content validation process followed the guidelines recommended by the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) panel. **Results:** The construct of the Abilitator combines the multidimensional and biopsychosocial models of work ability and functioning. It also includes aspects of social inclusion and employability. It evaluates social, psychological, cognitive and physical functioning, and the ability to cope with everyday life. The content of these concepts was validated by the academic and practical expert panels. The Abilitator's 79 ICF codes covered 57% of the Generic, 77% of the Brief Vocational Rehabilitation, and 8% of the Minimal Environmental ICF Core Sets. When compared with the Work Ability Index (WAI) and the World Health Organization Disability Assessment Schedule (WHODAS 2.0), the direct equivalences of the ICF codes were 36 and 44%, respectively. **Conclusion:** The Abilitator sufficiently comprehensively covers the relevant aspects to enable the assessment of the overall work ability and functioning of the population in a weak labour market position.

Wikström et al. 2020.

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

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Keywords: Content validity; Employability; Functioning; Health; ICF; Inclusion; Self-report; Unemployment; Well-being; Work ability

Evidence Level: 5A

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-8391-8>

How is the self-perceived work ability affected by the duration of unemployment, heart rate variability and the amount of physical activity in older long-term unemployed persons?

Background: This study investigated whether work ability is associated with the duration of unemployment, heart rate variability (HRV), and the level of physical activity. **Methods:** Thirty-four unemployed persons (mean 55.7 ± standard deviation 33.3 years, 22 female, 12 male, unemployed: range 1-22.5 years) participated in the cross-sectional study. The Work Ability Index (WAI) and International Physical Activity Questionnaire (IPAQ) were applied. Short-term (five minutes) resting HRV (Low Frequency (LF), High Frequency (HF), Total Power (TP)) was collected. **Results:** Work ability was positively associated with the HRV: LF (r = 0.383; p = 0.025), HF (r = 0.412; p = 0.015) and TP (r = 0.361; p = 0.036). The WAI showed a positive linear correlation with the amount of total physical activity (r = 0.461; p = 0.006) as well as with the amount of moderate to vigorous physical activity (r = 0.413; p = 0.015). No association between the WAI and the duration of unemployment occurred. **Conclusions:** The relation between self-perceived work ability, health-associated parameters, the HRV and the level of physical activity points out the relevance of health-care exercise and the need of stress-reducing interventions to improve perceived work

ability. Our results point out the need for the further and more holistic development of healthcare for the unemployed.

Bumann et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Activities of daily life; Healthcare workers; Prevention; Quality of life

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/6/2039>

Work re-entry after childbirth: predictors of self-rated health in month one among a sample of university faculty and staff

Background: Childbirth represents a significant transition for women, with physical and psychological sequelae. Reentry to the workplace during the postpartum period is understudied, with implications for maternal well-being and job-related outcomes. This study's aim was to examine selected pregnancy, childbirth, and return-to-work correlates of overall self-rated health within the first month of work reentry after maternity leave. **Methods:** Between December 2016 and January 2017, we surveyed women employed at a large, public Midwestern university who had given birth in the past five years (N = 249) to examine self-rated overall health in the first month of work reentry. Using ordinal logistic regression, we examined whether physical or psychological health problems during pregnancy, childbirth complications, length of maternity leave, and depression and anxiety at work reentry were related to overall health.

Results: Women who experienced depression (odds ratio [OR] = 0.096 [95% confidence interval {CI} = 0.019 to 0.483, p = 0.004]) and anxiety (OR = 0.164, [95% CI = 0.042 to 0.635, p = 0.009]) nearly every day reported worse health at work reentry than those with no symptoms. Controlling for demographics and mental health, women who experienced medical problems during pregnancy (OR = 0.540 [95% CI = 0.311 to .935, p = 0.028]) were more likely to report poor health, while taking a longer maternity leave (OR = 14.552 [95% CI = 4.934 to 42.918, p < 0.001]) was associated with reporting better health at work reentry.

Conclusion: Women who experience medical complications during pregnancy, return to the workplace too soon after birth, and experience mental health symptoms are vulnerable physically as they return to work.

Falletta et al. 2020.

Safety and Health at Work, vol. 11, no. 1.

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Keywords: Leave; Maternity; Postpartum depression; Postpartum period; Return to work

Evidence Level: 5A

Link: <https://www.sciencedirect.com/science/article/pii/S2093791118305651?via%3Dihub>

Adapting to the Future of Work

Work Environment

Identifying needs for advancing the profession and workforce in environmental health

An ever-changing landscape for environmental health (EH) requires in-depth assessment and analysis of the current challenges and emerging issues faced by EH professionals. The Understanding the Needs, Challenges, Opportunities, Vision, and Emerging Roles in Environmental Health initiative addressed this need. After receiving responses from more than 1700 practitioners, during an in-person workshop, focus groups identified and described priority problems and supplied context on addressing the significant challenges facing EH professionals with state health agencies and local health departments. The focus groups developed specific problem statements detailing the EH profession and workforce's prevailing challenges and needs according to 6 themes, including effective leadership, workforce development, equipment and technology, information systems and data, garnering support, and partnerships and collaboration. We describe the identified priority problems and needs and provide recommendations for ensuring a strong and robust EH profession and workforce ready to address tomorrow's challenges.

Gerding et al. 2020.

American Journal of Public Health, vol. 110, no. 3.

User License:

Keywords: Environmental health, Workforce, Challenges, Emerging Issues, Health departments

Evidence Level: 5B

Link: https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2019.305441?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dpubmed

Flexible work arrangements in open workspaces and relations to occupational stress, need for recovery and psychological detachment from work

Background: The trend is going into the direction of flexible work arrangements in open workspaces in which employees can decide where and when to work. The aim of this study was to analyze effects of a transition to open workspaces including Activity Based Working (ABW) on employees' working conditions and their levels of occupational stress, need for recovery and psychological detachment from work.

Methods: Employees of a large technology company responded to a baseline and two follow-up measurements over one year. Data were collected via online survey assessing the employees' mental demands, workload, job autonomy, support from supervisor, team collaboration, satisfaction with communication climate and three well-being outcomes (occupational stress, need for recovery and psychological detachment from work). Descriptive statistical analyses, analyses of variance and regression analyses were applied to test the hypotheses. **Results:** Significant differences in working conditions were found after the transition, e.g. reduced mental demands, but an increased workload. Job autonomy, team collaboration and satisfaction with communication climate increased. Levels of occupational stress decreased significantly over time. Regression analyses revealed substantial associations between flexible work arrangements, job resources and occupational stress. **Conclusion:** The results contribute to the current knowledge on flexible work arrangements in open work spaces. They can be used to design future work settings aimed at increasing employees' well-being and job performance. Further practical implications and recommendations for future research are discussed.

Mache et al. 2020.

Journal of Occupational Medicine and Toxicology, vol. 15, no. 5.

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Keywords: Flexible work; Mental health; Open workspaces; Working conditions

Evidence Level: 5A

Link: <https://occup-med.biomedcentral.com/articles/10.1186/s12995-020-00258-z>

Aging Workforce

Employees' longer working lives in Europe: Drivers and barriers in companies

This paper identifies, within companies' sectors of activity, predictors of Human Resource (HR) policies to extend working life (EWL) in light of increasing policy efforts at the European level to extend working life. Three types of EWL practices are investigated: the prevention of early retirement (i.e. encouraging employees to continue working until the legal retirement age); delay of retirement (i.e. encouraging employees to continue working beyond the legal retirement age); and, recruitment of employees who are already retired (i.e. unretirement). A sample of 4624 European organizations that was stratified by size and sector is analyzed in six countries. The main drivers for companies' EWL practices are the implementation of measures for older workers to improve their performance, their working conditions, and to reduce costs. In industry, the qualities and skills of older workers could be more valued than in other sectors, while the adoption of EWL practices might be less affected by external economic and labor market factors in the public sector. Dutch and Italian employers may be less prone than others to extend working lives. These results underline the importance of raising employers' awareness and increase their actions to extend employees' working lives by adopting age management initiatives, especially in SMEs, and in the services and public sectors.

Principi et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Age management; Employers; Extending working life; International study; Older workers

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/5/1658>

Body Mass Index (BMI) and work ability in older workers: results from the health and employment after fifty (HEAF) prospective cohort study

This study explores associations between BMI and prolonged sickness absence; cutting down at work; and health-related job loss (HRJL) over two years of follow-up among workers aged ≥ 50 years. A cohort of 2299 men and 2425 women (aged 50-64 years) self-reported height and weight at baseline and provided information about work ability at 12 and 24 months for the Health and Employment after Fifty (HEAF) Study. Associations between BMI and work ability were assessed by logistic regression and HRJL by multiple-record Cox's proportional hazards models, with adjustment for other risk factors. The prevalence of obesity/severe obesity was 22.6%/1.2% amongst men and 21.4%/2.6% amongst women, respectively. In men and women, obesity and severe obesity predicted having to cut down at work for health over two years. In women, severe obesity predicted prolonged sickness absence, and also HRJL even after adjustment for age, proximity to retirement, financial difficulties, and lifestyle factors (hazard ratio [HR] 2.93, 95% CI 1.38, 6.23), and additional adjustment for health conditions (HR 2.52, 95% CI 1.12, 5.67). Obesity, and particularly severe obesity, negatively impacts work ability amongst people aged 50-64 years, with greatest effects in women. Obesity can be expected to hinder attempts to encourage work to older ages.

Linaker et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Body mass index; Health-related job loss; Obesity; Older worker; Sickness absence; Work ability

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/5/1647>

Determinants of voluntary early retirement for older workers with and without chronic diseases: A Danish prospective study

Aims: This study explored differences in determinants (i.e. health-related, work-related and social factors) of voluntary early retirement between older workers with and without chronic diseases in Denmark.

Methods: Workers aged 56-64 years who were members of a voluntary early retirement scheme were selected from the Danish National Working Environment Survey (2008-2009) and were followed in a public register for four years. Cox regression analyses were performed separately for older workers with and without chronic disease to identify the associations between determinants and voluntary early retirement. To explore the differences between groups, an interaction term between the determinant and having a chronic disease was included in the analyses for the total population. **Results:** Among 1861 eligible older workers, determinants associated with a higher risk of voluntary early retirement included poorer self-rated health, more depressive symptoms, a higher physical workload, lower job satisfaction and lower influence at work. For older workers with a chronic disease ($n=1185$), the presence of work-family conflict was also associated with a higher risk of voluntary early retirement, whereas for those with no chronic disease ($n=676$), a poorer relationship with colleagues was an additional determinant. Higher emotional demands, a higher work pace and higher quantitative demands were not significantly associated with voluntary early retirement for either group. None of the interaction terms was found to be statistically significant ($p>0.05$). **Conclusions:** Determinants associated with voluntary early retirement did not significantly differ between older workers with or without a chronic disease in Denmark. We conclude that several health-related, work-related and social factors are important for prolonged labour force participation of older workers (with and without a chronic disease).

Sewdas et al. 2020.

Scandinavian Journal of Public Health, vol. 48, no. 2.

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Keywords: Voluntary early retirement; Ageing; Chronic disease; Employment participation; Older workers

Evidence Level: 4B

Link: https://journals.sagepub.com/doi/full/10.1177/1403494819852787?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed

Guiding and Supporting Mental Health and Wellbeing

Mental Health

To disclose or not to disclose: a multi-stakeholder focus group study on mental health issues in the work environment

Purpose: Whether or not to disclose mental illness or mental health issues in the work environment is a highly sensitive dilemma. It can facilitate keeping or finding paid employment but can also lead to losing employment or to not being hired, because of discrimination and stigma. Research questions were: (1) what do stakeholders see as advantages and disadvantages of disclosing mental illness or mental health issues in the work environment? (2) what factors are of influence on a positive outcome of disclosure?

Methods: A focus group study was conducted with five different stakeholder groups: people with mental illness, Human Resources professionals, employers, work reintegration professionals, and mental health advocates. Sessions were audio-taped and transcribed verbatim. Thematic content analysis was performed by two researchers using AtlasTi-7.5. Results were visually represented in a diagram to form a theoretical model. **Results:** Concerning (dis-)advantages of disclosure, six themes emerged as advantages (improved relationships, authenticity, work environment support, friendly culture) and two as disadvantages (discrimination and stigma). Of influence on the disclosure outcome were: Aspects of the disclosure process, workplace factors, financial factors, and employee factors. Stakeholders generally agreed, although distinct differences were also found and discussed in the paper. **Conclusion:** As shown from the theoretical model, the (non-)disclosure process is complex, and the outcome is influenced by many factors, most of which cannot be influenced by the individual with mental illness. However, the theme 'Aspects of the disclosure process', including subthemes: who to disclose to, timing, preparation, message content and communication style is promising for improving work participation of people with mental illness or mental health issues, because disclosers can positively influence these aspects themselves.

Brouwers et al. 2020.

Journal of Occupational Rehabilitation, vol. 30, no. 1.

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Keywords: Disclosure; Discrimination; Employment; Mental illness; Stigma

Evidence Level: 5A

Link: <https://link.springer.com/article/10.1007%2Fs10926-019-09848-z>

Impact of cognitive symptoms on health-related quality of life and work productivity in Chinese patients with major depressive disorder: results from the PROACT study

Purpose: This post hoc analysis was undertaken to further explore the association of cognitive symptoms with health-related quality of life (HRQoL) and work productivity at the time of treatment initiation in Chinese patients with major depressive disorder (MDD) in the Prospective Research Observation to Assess Cognition in Treated patients with MDD (PROACT) study. **Patients and Methods:** This was an epidemiological, non-interventional, prospective cohort study in adult outpatients with moderate-to-severe MDD initiating antidepressant monotherapy (first or second line). Crude and adjusted analyses of covariance were performed to assess the association of perceived cognitive symptoms (20-item Perceived Deficits Questionnaire-Depression [PDQ-D] total score) or observed cognitive performance (Digit Symbol Substitution Test [DSST] score) with HRQoL (EuroQoL 5-Dimensions Questionnaire index) and work productivity (Work Productivity and Activity Impairment [WPAI] or Sheehan Disability Scale [SDS] absenteeism and presenteeism scores). Adjusted analyses included depression severity, age, sex, residential area (urban/rural), and educational level. **Results:** Of 1008 patients enrolled in the PROACT study, 986 were included in this analysis. Severity of perceived cognitive symptoms (ie, higher PDQ-D total score) was significantly associated with worse HRQoL ($P < 0.001$) and higher levels of absenteeism ($P = 0.020$ for the WPAI and $P = 0.002$ for the SDS) and presenteeism ($P < 0.001$ for both scales). The association of perceived cognitive symptoms with HRQoL and presenteeism was independent of depression severity. The association between observed cognitive performance (DSST score) and HRQoL was less robust. No

association was seen between observed cognitive performance and levels of absenteeism or presenteeism assessed by either scale. **Conclusion:** Results of this real-world study illustrate the impact of cognitive symptoms on HRQoL and work productivity in Chinese patients with MDD, and highlight the importance of assessing and targeting cognitive symptoms in order to improve functional outcomes when treating patients with MDD.

Wang et al. 2020.

Neuropsychiatric Disease and Treatment.

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(<https://creativecommons.org/licenses/by-nc/3.0/>)

Keywords: Absenteeism; Cognitive symptoms; Health-related quality of life; Major depressive disorder; Presenteeism; Work productivity

Evidence Level: 4B

Link: <https://www.dovepress.com/impact-of-cognitive-symptoms-on-health-related-quality-of-life-and-wor-peer-reviewed-article-NDT>

'I'm proud of how far I've come. I'm just ready to work': mental health recovery narratives within the context of Australia's Disability Employment Services

Background: Employment is recognised as facilitating the personal and clinical recovery of people with psychosocial disability. Yet this group continue to experience considerable barriers to work, and, constitute a significant proportion of individuals engaged with Disability Employment Services (DES). Recognition of the role of recovery-oriented practice within DES remains limited, despite these approaches being widely promoted as best-practice within the field of mental health. **Methods:** The Improving Disability Employment Study (IDES) aims to gather evidence on factors influencing employment outcomes for Australians with disability. Descriptive analysis and linear regression of IDES survey data from 369 DES participants, alongside narrative analysis of data collected through 56 in-depth interviews with 30 DES participants with psychosocial disability, allowed us to explore factors influencing mental health, well-being and personal recovery within the context of DES. **Results:** Psychosocial disability was reported as the main disability by 48% of IDES respondents. These individuals had significantly lower scores on measures of mental health and well-being (44.9, 48.4 respectively, $p \leq 0.01$), compared with respondents with other disability types (52.2, 54.3 $p \leq 0.01$). Within this group, individuals currently employed had higher mental health and well-being scores than those not employed (47.5 vs 36.9, 55.5 vs 45.4 respectively, $p \leq 0.01$). Building on these findings, our qualitative analysis identified five personal recovery narratives: 1) Recovery in spite of DES; 2) DES as a key actor in recovery; 3) DES playing a supporting role in fluctuating journeys of recovery; 4) Recovery undermined by DES; and, 5) Just surviving regardless of DES. Narratives were strongly influenced by participants' mental health and employment status, alongside the relationship with their DES worker, and, participants' perspectives on the effectiveness of services provided. **Conclusion:** These findings re-iterate the importance of work in supporting the mental health and well-being of people with psychosocial disability. Alongside access to secure and meaningful work, personal recovery was facilitated within the context of DES when frontline workers utilised approaches that align with recovery-orientated practices. However, these approaches were not consistently applied. Given the number of people with psychosocial disability moving through DES, encouraging greater consideration of recovery-oriented practice within DES and investment in building the capacity of frontline staff to utilise such practice is warranted.

Devine et al. 2020.

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

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Keywords: Disability employment services; Mental illness; Personal recovery; Psychosocial disability

Evidence Level: 5B

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-8452-z>

Bullying and Harassment

The relationships of experiencing workplace bullying with mental health, affective commitment, and job satisfaction: application of the job demands control model

There have been very few theoretical models published to understand the relationship between workplace bullying and different outcome variables. Applying the Job Demands Control (JDC) model, this study analyzed workplace bullying alongside 'traditional' job stressors of role overload and low job control to determine the relative associations of each with mental health and wellbeing. These relative associations have not been well documented. Data were obtained from an organizational climate questionnaire administered to 21 Australian Defence Force units (n = 3193). Results indicated that the correlations between bullying and psychological distress (r = 0.39), job satisfaction (r = -0.28), and affective commitment (r = -0.22) were all significant and for some outcomes greater than those involving the traditional job stressors. Furthermore, for each of these three outcomes, bullying contributed incremental variance after controlling for other job demands. These results support earlier claims that workplace bullying requires the same attention given to traditional work stressors. The JDC model provides a strong theoretical base to investigate workplace bullying. Testing against other stressors allows for consideration of the broader context of workplace bullying when managing the workforce.

Steele et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: Bullying; Commitment; Military; Mobbing; Psychological distress; Satisfaction

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/6/2151>

Bullying in fly-in-fly-out employees in the Australian resources sector: A cross-sectional study

Background: Workplace bullying has diverse consequences at both the organisational and individual level. Anecdotal reports indicate that workplace bullying is an issue of particular concern for Australian FIFO workers, which may impact on psychosocial distress. However, no prior studies have examined this issue empirically in a FIFO worker cohort. **Methods and Materials:** A cross-sectional survey study design was used to establish the prevalence of bullying in Australian FIFO, antecedents of bullying, and its association with psychosocial distress. Responses were received from 580 FIFO workers in the Australian resources sector. Primary outcome measures were Negative Acts Questionnaire-Revised, Beck Depression Inventory II, and Beck Hopelessness Scale. Logistic regression models were constructed to examine the association between bullying, suicide risk, and clinical depression. **Results:** Over half of the respondents experienced workplace bullying (55.7%), and about one-third reported moderate or more severe depression (32.3%). Being above the median age (OR = 0.51; 95% CI = 0.31-0.83) and having a supervisor who failed to promote collaboration (OR = 3.04; 95% CI = 1.84-5.04) were both significantly associated with experiencing bullying. Bullying was associated with an almost threefold increase in the likelihood of participants reporting increased suicide risk (OR = 2.70; 95% CI = 1.53-4.76). Bullying was also associated with participants being almost two and a half times more likely to report clinical depression (OR = 2.38; 95% CI = 1.40-4.05). **Conclusion:** The incidence of bullying in Australian FIFO workers has reached alarming proportions. Bullying was significantly associated with higher levels of clinical depression and suicide risk. The results highlight the need to implement in the Australian resource sector interventions that reduce workplace bullying.

Miller et al. 2020.

PLoS One, vol.15, no.3.

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Keywords: Bullying; FIFO; Fly-in-fly-out; Workplace bullying; Australian workforce

Evidence Level: 4A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0229970>

Psychosocial Issues – Risk Factors

Employees' weekend activities and psychological well-being via job stress: a moderated mediation role of recovery experience

An employee's off-work activities are known to contribute positively to recovering their energy levels depleted by daily work. Despite this view and understanding, the effect of employees' weekend activities on their psychological well-being has not attracted sufficient research interest. Therefore, the purpose of this paper is to analyze the relationship between employees' weekend activities and their psychological well-being, and the mediating role of job stress in the above relationship. We also investigated the moderating role of the recovery experiences in the relationship between employees' weekend activities and job stress. Furthermore, we examined the moderated mediating effect of recovery experiences on the relationship among employees' weekend activity, job stress, and psychological well-being. The survey data was obtained from 294 employees working in 15 manufacturing companies in South Korea. The participants were 71.1% men and 28.9% women, 49.7% were university graduates, followed by 26.2% college graduates, 12.6% high school graduates, 10.2% post-graduates, and 1.4% Ph.D. holders. In terms of age composition, 50% participants were in their thirties, followed by 19.7% in their forties. The empirical analysis revealed that weekend activities are positively associated with employees' psychological well-being. Moreover, job stress was found to mediate the relationship between weekend activities and psychological well-being. We also found that the recovery experiences positively moderated the relationship between weekend activities and job stress. Further, the study revealed that the higher the level of recovery experience, the greater the effect of weekend activities on psychological well-being affected by job stress. The paper also discusses the theoretical and practical implications of the study.

Jeong et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Hierarchical multiple regression; Job stress; Moderated mediation effect; Psychological well-being; Recovery experiences; Weekend activities

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/5/1642>

Years of service, self-efficacy, stress and burnout among Polish firefighters

Objectives: The aim of the research was to analyze the impact of selected factors: years of service, the number of interventions, self-efficacy and stress, on occupational burnout. It was hypothesized that firefighters with more years of service and a bigger number of interventions would be characterized by higher perceived stress and burnout, and that self-efficacy would have an impact on reducing the level of perceived stress and burnout. **Material and Methods:** The participants were firefighters (N = 576) from 12 Polish voivodeships, aged 20-58 years, with different seniority: up to 3, 4-8, 9-15 or >15 years of service. The following research tools were used: the Burnout Questionnaire, the 10-item Perceived Stress Scale, the Generalized Self-Efficacy Scale, and an independent questionnaire to gather additional information. A correlation between particular variables was carried out; the Kruskal-Wallis test was performed together with a post-hoc analysis to examine differences in the severity of individual variables depending on seniority, followed by a path analysis studied together with the identification of direct and indirect impacts. **Results:** The number of interventions did not affect the severity of experienced stress or any of the aspects of burnout. Work experience directly influenced the level of perceived stress ($\beta = 0.219$), disillusion ($\beta = 0.076$), and relationship deterioration ($\beta = -0.156$). The generalized sense of self-efficacy was found to impact both on reducing the sense of stress ($\beta = -0.418$) and on all 4 aspects of professional burnout: psychophysical exhaustion ($\beta = -0.181$), relationship deterioration ($\beta = -0.16$), the sense of professional inefficacy ($\beta = -0.275$) and disillusion ($\beta = -0.143$). **Conclusions:** The results have shown that: 1) the number of interventions does not affect the severity of experienced stress or particular aspects of burnout; 2) years of service increase the severity of experienced stress and occupational burnout; 3) self-efficacy has an impact both on reducing the sense of stress and on all aspects of burnout.

Makara-Studzinska et al. 2020.

International Journal of Occupational Medicine and Environmental Health.

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Keywords: Link Burnout Questionnaire; Burnout; Firefighters; Self-efficacy; Stress; Years of service

Evidence Level: 4B

Link: <http://ijomeh.eu/Years-of-Service-Self-Efficacy-Stress-and-Burnout-among-Polish-Firefighters,116957,0,2.html>

Impact of work-family conflict, job stress and job satisfaction on seafarer performance

A lack of research has been undertaken to explore work-family conflict and its impact on the shipping industry. The objective of the present study was to empirically examine the effects of work-family conflict, job stress, and job satisfaction on seafarer performance. Data were collected from merchant ship seafarers in the Yangshan Port, Shanghai, China (n = 337). A data analysis was performed using hierarchical regression analysis. The research results revealed that work-family conflict and job stress negatively affects seafarer self-reported performance, while job satisfaction positively influences seafarer job performance. Findings also show that job satisfaction plays a moderating role in the relationships between work-family conflict, job stress and seafarer performance. Our findings demonstrate that work-family conflict, job stress and job satisfaction manifested are significant predictors for seafarer performance. Important applications and implications are provided for managers and researchers.

An et al. 2020.

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

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Keywords: Performance; Safety; Seafarer; Stress; Work–family conflict

Evidence Level: 4B

Link: <https://www.mdpi.com/1660-4601/17/7/2191>

Effects of exposure to workplace terrorism on subsequent doctor certified sickness absence, and the modifying role of psychological and social work factors: a combined survey and register study

Background: Studies have shown that terrorist attacks affect the mental and physical health of persons exposed to terrorism. When terror strikes at the workplace where people spend much time, and should feel safe, the health consequences for those affected might be severe. The aim of the study was to determine whether psychological and social work factors moderates effects of exposure to a workplace terrorist attack on subsequent doctor-certified sickness absence. **Methods:** The study design combined survey data with register data on sickness absence. Data on exposure to the attack, and psychosocial working conditions were collected by a web-based questionnaire 10 months after the attack. Survey data was linked to registry data on doctor-certified sickness absence over the one-year time period following baseline. The survey response rate was 56% (n = 1974), where 80.6% (1591) gave consent to link survey data to data on sickness absence. Exposure to the attack was assessed as "Directly-", or "Indirectly exposed". Psychological and social work factors were measured by the General Questionnaire for Psychological and Social factors at Work (QPSNordic). Data were analyzed with negative binominal hurdle regressions. **Results:** Direct exposure to the attack increased the odds of becoming sick-listed if role clarity was average (OR = 1.50) or high (OR = 2.13), but not if low (OR = 1.17). Direct exposure was associated with higher sickness absence rates if control over work pace was low (RR = 1.61). Role conflict, support from co-workers, and -superior showed weaker evidence of moderating effects of exposure on sickness absence. **Conclusions:** Exposure to the bomb explosion, as well as psychosocial working conditions affect the risk of employee sickness absence. Psychosocial working conditions seems to moderate effects of exposure to workplace terrorism on subsequent sickness absence. Organizations would benefit from striving for good psychological and social working conditions both as preventions against illness and sickness absence, and as measures in the aftermath of a workplace terrorist attack.

Berthelsen et al. 2020.

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

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Keywords: Psychosocial; Sick-leave; Terror; Workplace

Evidence Level: 5B

Link: <https://bmcpublikealth.biomedcentral.com/articles/10.1186/s12889-020-08465-3>

Burnout

The development of a proactive burnout prevention inventory: How employees can contribute to reduce burnout risks

Proactive burnout prevention refers to a set of proactive behaviors employees may engage in to prevent burnout. Findings of a previous exploratory qualitative study indicated that employees who had to deal with high demands engaged in specific proactive behaviors in the work, home, and personal domain in order to prevent burnout. To further examine proactive burnout prevention in longitudinal quantitative research and to be able to investigate its effectiveness, an inventory for assessing these kinds of behaviors is necessary. The goal of this study was twofold: 1) to develop an inventory to assess employees' proactive burnout prevention behaviors and examine its factorial validity, 2) to explore the broader nomological network of proactive burnout prevention behaviors by examining its convergent, discriminant, and predictive validity. A two-wave longitudinal survey (T1: N = 343; T2: N = 201) was conducted. The results of exploratory and confirmatory factor analysis showed that proactive burnout prevention can be reliably assessed with 40 items that load on 12 factors, indicating 12 separate proactive burnout prevention behaviors. Moreover, exploration of the convergent, discriminant, and predictive validity of the proactive burnout prevention inventory showed promising results, as expected relationships were confirmed for most behaviors. Further research is needed to substantiate the findings and examine the effectiveness of proactive burnout prevention.

Otto et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Burnout; Inventory; Prevention; Proactive behavior; Scale development

Evidence Level: 5A

Link: <https://www.mdpi.com/1660-4601/17/5/1711>

Subjective age and job satisfaction: A moderated mediation model of job burnout and chronological age

Corresponding to the growing calls for theory-driven research on the age-job satisfaction association, the present study investigated direct and indirect (via job burnout) relationships between subjective age (felt age) and job satisfaction. The study also examined the moderating role of chronological age on both direct and indirect (via job burnout) relationships between subjective age and job satisfaction. Survey data were collected in three waves (2 months apart) from 355 employees in 62 firms operating in various service and manufacturing industry sectors in Pakistan. Data were analyzed using structural equation modeling, PROCESS macro for SPSS, and bootstrapping technique. The results showed subjective age was negatively related to job satisfaction, both directly ($\beta = -0.19$, $p < 0.001$) and indirectly, via job burnout ($\beta = -0.09$, bootstrap 95% confidence interval limits did not overlap with zero; lower limit = -0.15 , upper limit = -0.04). Interestingly, the interaction term (relative subjective age \times chronological age) had a significant negative effect on the direct negative association between subjective age and job satisfaction ($B = -0.12$, $p < 0.05$) and a significant positive effect on the direct positive relationship between subjective age and job burnout ($B = 0.14$, $p < 0.01$), showing that chronological age moderated the direct relationships of subjective age with job satisfaction and job burnout, respectively. Importantly, the results showed that chronological age moderated the indirect association (via job burnout) between subjective age and job satisfaction [bootstrap estimate = -0.025 , bias-corrected confidence interval (-0.06 , -0.002)]. The present study contributed to the literature on the age-job satisfaction association by suggesting subjective age as an alternative vantage point to look at this link between age and job satisfaction. The findings carry useful practical implications that can help managers counter age stereotyping, employees' feelings of job burnout, and a low level of employees' job satisfaction.

Anser et al. 2020.

Frontiers in Public Health, vol. 8, no. 62.

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Keywords: Chronological age; Job burnout; Job satisfaction; Moderated-mediation; Subjective age

Evidence Level: 4B

Link: <https://www.frontiersin.org/articles/10.3389/fpubh.2020.00062/full>

Burnout as a state: random-intercept cross-lagged relationship between exhaustion and disengagement in a 10-day study

Background: Burnout has been traditionally seen as a chronic and stable state in response to prolonged stress. However, measures of momentary burnout are not well established, even though the within-person approach suggests that the symptoms of burnout may vary from day to day for the same employee. The aim of this study is to examine the daily inter- and intra-personal variability of the symptoms of burnout and the cross-lagged relationship between two components of burnout, exhaustion and disengagement.

Methods: An online diary study over 10 consecutive workdays was conducted among 235 civil servants (75% women, average tenure of 15 years). Daily burnout was measured with the eight-item Oldenburg Burnout Inventory. **Results:** The intra-class correlation coefficients indicate that, although significant between-person variability exists, most of the burnout variance is within persons. Using the random intercept cross-lagged panel (RI-CLP) model to control for these between-person differences, mainly insignificant "pure" within-person cross-lagged relationships between exhaustion and disengagement were revealed. Moreover, day-to-day autoregressive effects were weaker than same-day residual correlations.

Conclusion: This is one of the first studies to use daily diaries and the RI-CLP model to study burnout, including the separation of the more stable and more dynamic parts of each component. When stable parts were controlled for, the same-day relationships between exhaustion and disengagement were more pronounced than day-to-day effects. This might suggest stronger situational influences than carryover mechanism. Thus, conceptualizing burnout in terms of daily symptoms may shed promising insights into how it develops and add implications for pro-healthy changes in the workplace.

Basinska et al. 2020.

Psychology Research and Behavior Management.

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Keywords: Burnout; Cross-lagged effect; Diary study; Multilevel analysis; the Oldenburg Burnout Inventory

Evidence Level: 5A

Link: <https://www.dovepress.com/burnout-as-a-state-random-intercept-cross-lagged-relationship-between-peer-reviewed-article-PRBM>

Enabling Healthy and Safe Workplaces

Health and Wellbeing

Defining 'Integration' for Total Worker Health®: A new proposal

The effects of work and the conditions of employment on health behaviors and intermediate health conditions have been demonstrated, to the extent that these relationships should be addressed in efforts to prevent chronic disease. However, conventional health promotion practice generally focuses on personal risk factors and individual behavior change. In an effort to find solutions to the myriad of health challenges faced by the American workforce, the U.S. National Institute for Occupational Safety and Health (NIOSH) established the Total Worker Health® (TWH) program. Originally organized around the paradigm of integrating traditional occupational safety and health protections with workplace health promotion, TWH has evolved to a broader emphasis on workplace programs for enhancing worker safety, health, and well-being. Among the research programs and approaches developed by investigators at NIOSH Centers of Excellence for TWH and elsewhere, definitions of 'integration' in workplace interventions vary widely. There is no consensus about which organizational or individual outcomes are the most salient, how much to emphasize organizational contexts of work, or which program elements are necessary in order to qualify as 'Total Worker Health'. Agreement about the dimensions of integration would facilitate comparison of programs and interventions which are self-defined as TWH, although diverse in content. The specific criteria needed to define integration should be unique to that concept-i.e. distinct from and additive to conventional criteria for predicting or evaluating the success of a workplace health program. We propose a set of four TWH-specific metrics for integrated interventions that address both program content and process: (i) coordination and interaction of workplace programs across domains; (ii) assessment of both work and non-work exposures; (iii) emphasis on interventions to make the workplace more health-promoting; and (iv) participatory engagement of workers in pivotal ways during intervention prioritization and planning to develop self-efficacy in addressing root causes, skill transfer, building program ownership,

empowerment, and continuous improvement. Thus we find that integration requires organizational change, both to engage two managerial functions with different goals, legal responsibilities, and (often) internal incentives & resources, and also to orient the organization toward salutogenesis. Examples from research activity within the Center for the Promotion of Health in the New England Workplace illustrate how these criteria have been applied in practice.

Punnett et al. 2020.

Annals of Work Exposure and Health, vol. 64, no. 3.

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Keywords: CPH-NEW; Total Worker Health; Intervention; Participatory; Salutogenesis; Well-being; Work organization

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7064271/>

Alcohol consumption and employment: a cross-sectional study of office workers and unemployed people

Background: Alcohol is a psychoactive substance with toxic and addictive properties. Biomarkers like GGT, AST, ALT and MCV are influenced by excessive ethanol consumption. Alcohol consumption represents a health risk and it has been linked to unemployment. The aim of this study how working status predict alcohol consumption through a cross sectional study comparing alcohol-related biomarkers levels in office workers and unemployed people. **Methods:** This study includes 157 office workers and 157 unemployed people, who were recruited from January to December 2018. A propensity score matching procedure was applied to obtain two homogenous groups in terms of age and gender. A non-parametric analysis was performed on serum biomarkers that are generally altered by alcohol consumption. Logistic regression models were designed to evaluate how working status predict abnormal biomarker levels related with alcohol consumption. **Results:** No differences in median biomarker values were found between groups. Logistic regression analysis showed that office work is a negative predictor of pathological biomarker levels. Office workers had a significant relation with the levels of GGT (OR 0.48; 95% CI [0.28-0.84]), AST (OR 0.42; 95% CI [0.22-0.78]), ALT (OR 0.39; 95% CI [0.23-0.66]), and MCV (OR 0.37; 95% CI [0.19-0.70]). **Conclusion:** Office workers had lower absolute frequencies of pathological values of alcohol consumption biomarkers, after matching for age and gender compared with unemployed people. In addition, a significant negative association between office work is a negative predictor of biomarker levels of alcohol consumption. These results showed that work is an important determinant of health and that can represent a benefit for workers in terms of reducing the risk of consuming alcohol.

De Sio et al. 2020.

PeerJ.

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Keywords: Alcohol and work; Alcohol consumption; Occupational medicine; Office work

Evidence Level: 4A

Link: <https://peerj.com/articles/8774/>

Obesity prevalence in Brazilian firefighters and the association of central obesity with personal, occupational and cardiovascular risk factors: a cross-sectional study

Objectives: This study aimed to investigate the obesity prevalence in a population of Brazilian firefighters and the association of central obesity (CO) with sociodemographic, occupational, life habits, fitness and health status variables. **Design:** Cross-sectional study. **Settings:** The data were collected during annual health inspections of firefighters from the Military Fire Service of the State of Espírito Santo, a state in Southeast Brazil. **Participants:** The study encompassed 1018 active military firefighters. After exclusion criteria, 892 male firefighters were analysed. **Primary and Secondary Outcome Measures:** The collected data included: sociodemographic, occupational, lifestyle, fitness and health status variables. The associations between these factors and CO were calculated by adjusted OR through a hierarchical logistic regression model. **Results:** Obesity estimation by body mass index indicated that 48.65% of the firefighters were overweight and 10.99% were obese. Concerning the body fat percentage, 26.23% of the participants were considered obese, while 18.61% of the firefighters were considered centrally obese or at risk using the waist circumference measure. After adjusted OR analysis, CO was more likely associated with the age

range of 50 to 59 years old (OR 2.93; 95% CI 1.05 to 8.14), low self-reported physical activity (OR 1.95; 95% CI 1.14 to 3.34), low cardiorespiratory fitness (OR 5.15; 95% CI 3.22 to 8.23), hyperglycaemia (OR 1.70; 95% CI 1.07 to 2.72) and hypertriglyceridaemia fasting status (OR 3.12; 95% CI 1.75 to 5.55). **Conclusions:** Our study identified an overall high prevalence of overweight and obese individuals in the examined firefighter population. Age and cardiovascular risk factors were directly associated with CO among the firefighters. Cardiovascular risk factors should be routinely inspected within the Brazilian firefighters' corporations in order to improve the health condition and wellness of these workers. These endeavours will improve the performance of the services provided to the population.

Damacena et al. 2020.

BMJ Open, vol. 10, no. 3.

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Keywords: Cardiovascular risk; Firefighters; Obesity; Occupational; Sociodemographic

Evidence Level: 4B

Link: <https://bmjopen.bmj.com/content/10/3/e032933.long>

The company you keep: health behaviour among work peers

There is widespread agreement that behavior crucially influences one's health. However, little is known about what actually determines health-related behavior. We explore the impact of the place where many people spend most of their time, at work, and analyze whether an individual's decision to participate in health screening is related to the observed behavior of peers at work. We use linked employer-employee data and exploit the transitions of workers to new jobs. We find that the health behavior of co-workers highly correlated. A comparison of individuals moving into new firms shows that participation in general health checks, mammography screening, and prostate-specific antigen tests increases with the share of work peers attending these screenings. To differentiate between peer effects and common influences at the workplace, we further separate the peer groups within firms and show that workers with similar characteristics tend to have a stronger effect on individual screening participation.

Pruckner et al. 2020.

The European Journal of Health Economics, vol. 21, no. 2.

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Keywords: Health behavior; Peer effects; Screening; Workplace

Evidence Level: 5A

Link: <https://link.springer.com/article/10.1007%2Fs10198-019-01124-4>

Chronic Health Issues

Predictors for continued participation of employees in structured outpatient obesity intervention programmes

Background: Overweight, obesity and the conditions resulting from them have become one of the major challenges for health systems all over the world. High dropout rates are particularly common among the participants in outpatient obesity intervention programmes (OIP). Limited research has examined retention in OIP. **Methods:** Based on the data of a 24-month Bundeswehr outpatient OIP with a total of 630 participants, predisposing factors ($n = 30$) for continued participation beyond an early stage (0-3 months) and beyond a later stage (0-6 months) were analysed by means of a logistic regression analysis. In order to correct for multiple-comparison, the p-value was adjusted ($p^* < 0.0017$). **Results:** Three hundred out of 630 participants continued to participate beyond an early stage and 205 beyond a later stage. Besides an age between 40 and 50 at the beginning of the outpatient OIP, it was possible to show that knowledge of one's blood pressure and a positive lifestyle prior to participation in the programme (higher level of sporting activity) were predisposing factors for early dropout (>3 months) in the intervention programme.

Discussion: The possible predisposing factors examined accounted for about 35% of the variance in a rough estimate. In order to improve long-term participation in workplace outpatient OIP, the study focused on how the motivation of older people and employees with an unfavourable cardiovascular risk profile could be improved

Sammito et al. 2020.

Preventative Medicine Reports.

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Keywords: Dropout analysis; Intervention; Overweight; Secondary disorders

Evidence Level: 4A

Link: <https://www.sciencedirect.com/science/article/pii/S2211335520300115?via%3Dihub>

Interventions to reduce the risk of cardiovascular disease among workers: a systematic review and meta-analysis

This study examined the effect of lifestyle interventions on cardiovascular disease risk factors among workers. The study comprised a systematic review and meta-analysis of controlled trials. Relevant controlled trials were searched, with selections based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Risk of bias was assessed using the Scottish Intercollegiate Guidelines Network (SIGN). Of 1174 identified publications, one low-quality study was excluded. Finally, 10 were analyzed. The effect sizes were analyzed for heterogeneity, and random effect models (Hedge's g) were used. A subgroup analysis was performed on the follow-up point of intervention (≤ 12 months vs. > 12 months). Publication bias was also analyzed. Interventions were effective for systolic ($g = 0.66$, 95% CI: 0.27-1.60) and diastolic blood pressure ($g = 0.63$, 95% CI: 0.21-1.06), and BMI ($g = 0.71$, 95% CI: 0.15-1.11). Interventions were ineffective for weight ($g = 0.18$, 95% CI: -0.04, 0.40) and LDL-cholesterol ($g = 0.46$, 95% CI: -0.02, 0.93). There was high heterogeneity between studies ($I^2 = 78.45$ to $I^2 = 94.61$). There was no statistically significant publication bias, except for systolic blood pressure. Interventions to reduce risk of cardiovascular disease risk might be effective in improving physical outcomes, but additional high-quality trials are needed in the future.

Hwang et al. 2020.

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

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Keywords: Cardiovascular disease; Intervention study; Meta-analysis; Systematic review; Workers

Evidence Level: 1A

Link: <https://www.mdpi.com/1660-4601/17/7/2267>

Sedentary Practices

Standing meetings are feasible and effective in reducing sitting time among office workers-walking meetings are not: mixed-methods results on the feasibility and effectiveness of active meetings based on data from the "Take a Stand!" study

Active meetings (standing or walking) have the potential to reduce sitting time among office workers. The aim of the present study was to explore the feasibility and effectiveness of standing and walking meetings. The "Take a Stand!" study was a cluster-randomized trial, consisting of multiple components including the possibility of active meetings. Analyses were based on the 173 participants in the intervention group. Feasibility was evaluated by questionnaire and interview data from participants, ambassadors and leaders. Effectiveness was assessed as the change in objectively measured sitting time from baseline to 3 months follow-up. Regular standing meetings were implemented at all offices and were generally popular, as they were perceived as more effective and focused. In contrast, only a few walking meetings were completed, and these were generally associated with several barriers and perceived as ineffective. Participants who participated in standing meetings on a regular basis had 59 min less sitting per 8 h workday (95%CI -101;-17) compared to participants who did not participate in standing meetings at all. Walking meeting participation was not significantly associated with changes in sitting time, likely due to the low number of employees who used this option. This explorative study concludes that standing meetings in office workplaces were feasible and well-liked by the employees, and having frequent standing meetings was associated with reduced sitting time. In contrast, walking meetings were unfeasible and less liked, and thus had no effect on sitting time.

Danquah et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Active meetings; Intervention; Meetings; Mixed methods; Occupational sitting; Sedentary behavior; Sitting time; Standing meetings; Walking meetings; Workplace

Evidence Level: 2A

Link: <https://www.mdpi.com/1660-4601/17/5/1713>

Physical Activity

Effect of 12-week interventions involving Nordic walking exercise and a modified diet on the anthropometric parameters and blood lipid profiles in overweight and obese ex-coal miners

Background: Overweight and obesity after retirement are likely to be caused by unhealthy eating habits and the energy intake exceeding the energy expenditure. **Objectives:** This study was designed to assess the effects of two 12-week interventions involving, respectively, either regular physical activity or a modified lower-calorie diet on the anthropometric parameters and blood lipid profiles in overweight and obese retired miners with lipid disorders. **Design:** The study participants ($n = 30$, aged 58.7 ± 4.1 years, body height 174.8 ± 7.3 cm, body weight 96.6 ± 13.9 kg) were randomly assigned to 2 intervention groups: the Nordic walking group (NW), which exercised with intensity from 60 to 70% of participants' maximal heart rates for 1 h 3 times a week, and the modified diet group (MD). Modification of the diet consisted of reducing the daily energy intake by 30%, increasing the dietary content of mono- and polyunsaturated fatty acids and dietary fiber, and reducing the proportion of saturated fatty acids. The variables assessed at baseline and after 6 and 12 weeks were: anthropometric parameters (body weight, fat mass content [FM], fat percentage [BF], BMI, waist circumference [WC], hip circumference [HC], and waist-to-hip ratio [WHR]) and blood lipid indicators (total cholesterol [TC], triglycerides [TG], low density lipoprotein cholesterol [LDL-C], and high density lipoprotein cholesterol [HDL-C]). **Results:** The body weight of the participants in the NW was lower at week 12 by an average of 5 kg, BMI by 6%, FB by 19%, FM by 15%, WC by 8%, HC by 6%, and WHR by 3%. In the MD, the respective decreases were 8 kg and 8, 25, 20, 6, 2, and 7%. In the MD, the postintervention concentrations of TC and TG were within the reference range. **Conclusion:** Both 12-week interventions improved the anthropometric parameters and blood lipid profiles of retired heavy manual workers, with the improvements being more pronounced in the dieting group.

Sadowska-Krępa et al. 2020.

Obesity Facts.

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Keywords: Caloric restriction; Lipid disorders; Obesity; Physical activity; Retirement

Evidence Level: 4A

Link: <https://www.karger.com/Article/FullText/506403>

Time-efficient and computer-guided sprint interval exercise training for improving health in the workplace: a randomised mixed-methods feasibility study in office-based employees.

Background: The efficacy of high-intensity interval training (HIT) as a time-efficient exercise strategy for beneficially modifying risk factors for cardiovascular disease has repeatedly been demonstrated in controlled laboratory settings. However, the effectiveness of HIT in an unsupervised workplace setting has not been investigated. The objective of this study was to use mixed methods to investigate the feasibility, acceptability and effectiveness of a short-duration, high-intensity exercise intervention (REHIT) when applied unsupervised in a workplace setting. **Methods:** Twenty-five office-workers (mean \pm SD age: 47 ± 9 y, BMI: 27.5 ± 4.4 kgm⁻², $\dot{V}O_2$ max: 28 ± 7 mLkg⁻¹·min⁻¹) completed a 6-week REHIT intervention unsupervised in their workplace ($n = 13$, 6 men), or acted as a no-intervention control ($n = 12$, 6 men). The intervention consisted of 2 sessions/week of low-intensity (~ 25 W) cycling interspersed with 2 'all-out' sprints, increasing in duration from 10 to 20 s per sprint over the 6 weeks (total time-commitment: 8:40 min per session). $\dot{V}O_2$ max was assessed pre- and post-training, whilst questionnaire-based measures of exercise enjoyment, self-efficacy, and acceptability were completed post-training. Eight participants also completed post-intervention semi-structured interviews. **Results:** $\dot{V}O_2$ max significantly improved in the exercise group (2.25 ± 0.75 Lmin⁻¹ vs. 2.42 ± 0.82 Lmin⁻¹; + 7.4%) compared to the control group (2.22 ± 0.72 Lmin⁻¹ vs.

2.17 ± 0.74 Lmin⁻¹; - 2.3%; time*intervention interaction effect: p < 0.01). Participants considered the REHIT intervention acceptable and enjoyable (PACES: 89 ± 17 out of 119) and were confident in their ability to continue to perform REHIT (7.8 ± 1.2 out of 9). Qualitative data revealed that REHIT offered a time-efficient opportunity to exercise, that was perceived as achievable, and which encouraged highly valued post-exercise outcomes (e.g. progress towards health/fitness benefits). **Conclusions:** REHIT could be implemented as a feasible, effective and acceptable exercise intervention in a workplace setting, with a total time-commitment of < 20 min/week. Consideration of certain psycho-social factors and behaviour-change techniques may ensure adherence to the REHIT programme in the long term.

Metcalf et al. 2020.

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

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Keywords: Acceptability; Cardiorespiratory fitness; Effectiveness; Exercise; Feasibility; High-intensity interval training; Workplace health

Evidence Level: 2A

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7068982/>

Social comparison features in physical activity promotion apps: scoping meta-review

Background: Smartphone apps promoting physical activity (PA) are abundant, but few produce substantial and sustained behavior change. Although many PA apps purport to induce users to compare themselves with others (by invoking social comparison processes), improvements in PA and other health behaviors are inconsistent. Existing literature suggests that social comparison may motivate PA for some people under some circumstances. However, 2 aspects of work that apply social comparison theory to PA apps remain unclear: (1) how comparison processes have been operationalized or harnessed in existing PA apps and (2) whether incorporating sources of variability in response to comparison have been used to tailor comparison features of apps, which could improve their effectiveness for promoting PA. **Objective:** The aim of this meta-review was to summarize existing systematic, quantitative, and narrative reviews of behavior change techniques in PA apps, with an emphasis on social comparison features, to examine how social comparison is operationalized and implemented. **Methods:** We searched PubMed, Web of Science, and PsycINFO for reviews of PA smartphone apps. Of the 3743 initial articles returned, 26 reviews met the inclusion criteria. Two independent raters extracted the data from these reviews, including the definition of social comparison used to categorize app features, the percentage of apps categorized as inducing comparison, specific features intended to induce comparison, and any mention of tailoring comparison features. For reference, these data were also extracted for related processes (such as behavioral modeling, norm referencing, and social networking). **Results:** Of the included review articles, 31% (8/26) categorized app features as prompting social comparison. The majority of these employed Abraham and Michie's earliest definition of comparison, which differs from versions in later iterations of the same taxonomy. Very few reviews specified what dimension users were expected to compare (eg, steps, physical fitness) or which features of the apps were used to induce comparison (eg, leaderboards, message boards). No review referenced tailoring of comparison features. In contrast, 54% (14/26) reviews categorized features for prompting behavioral modeling and 31% (8/26) referenced tailoring app features for users' personal goals or preferences. **Conclusions:** The heterogeneity across reviews of PA apps and the absence of relevant information (eg, about dimensions or features relevant for comparison) create confusion about how to best harness social comparison to increase PA and its effectiveness in future research. No evidence was found that important findings from the broader social comparison literature (eg, that people have differing preferences for and responses to social comparison information) have been incorporated in the design of existing PA apps. Greater integration of the mobile health (mHealth) and social comparison literatures may improve the effectiveness of PA apps, thereby increasing the public health impact of these mHealth tools.

Arigo et al. 2020.

Journal of Medical Internet Research, vol. 22, no. 3.

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Keywords: Physical activity; Smartphone; Apps; Technology; Health; Wellbeing

Evidence Level: 1A

Link: <https://www.jmir.org/2020/3/e15642/>

Relationship of workplace exercise with work engagement and psychological distress in employees: A cross-sectional study from the MYLS study

We investigated the relationship between workplace exercise and psychological distress, and work engagement, both of which are factors related to the mental health and work productivity of employees. Data from the Meiji Yasuda Lifestyle study, collected from July 2017 through December 2017, were used. Data from an annual health checkup and questionnaire were collected from the Meiji Yasuda Shinjuku Medical Center in Tokyo, Japan. The 1321 participants (mean age: 50.8 ± 9.5 years, rate of female: 68.2%, rate of white-collar workers: 64.7%) were divided into three groups based on the frequency of performing workplace exercise: less than once, once or twice, and three or more times a week. Vigor of work engagement and psychological distress were assessed using the Utrecht Work Engagement Scale and Kessler Psychological Distress Scale (K6). Logistic regression analyses were performed to examine relationships between workplace exercise frequencies and work engagement or psychological distress. Demographic variables, health behaviors, health status, work characteristics, and objectively measured physical activity and sedentary behavior were adjusted for odds ratio (OR) and 95% confidence interval (95% CI). Participants who performed workplace exercise once or twice and three or more times a week showed a significantly higher OR (OR = 1.93, 95% CI = 1.00-3.71, $p = 0.049$, OR = 1.63, 95% CI = 1.23-2.15, $p = 0.001$, respectively) for vigor of work engagement. Neither groups of workplace exercise showed a significant OR for psychological distress even when adjusted for covariates. The practice of workplace exercise is positively and independently related to vigor of work engagements of physical activity and sedentary behavior, and the association was observed regardless of the frequency of once or twice, or three or more times a week. Workplace exercise, however, does not correlate with psychological distress. Our findings indicated that workplace exercise at least once or twice a week could have practical implications for the enhancement of vigor of work engagement, especially among white-collar workers.

Jindo et al. 2020.

Preventative Medicine Reports.

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Keywords: BMI, Body mass index; Kessler Psychological Distress Scale; Metabolic equivalents; Mental health; Physical activity; Physical activity; Sedentary behavior; UWES-9, Utrecht work engagement scale; Work productivity; Worker

Evidence Level: 4A

Link: <https://www.sciencedirect.com/science/article/pii/S2211335519302013?via%3Dihub>

Musculoskeletal Health

Kinesiophobia is not required to predict chronic low back pain in workers: a decision curve analysis

Background: Currently used performance measures for discrimination were not informative to determine the clinical benefit of predictor variables. The purpose was to evaluate if a former relevant predictor, kinesiophobia, remained clinically relevant to predict chronic occupational low back pain (LBP) in the light of a novel discriminative performance measure, Decision Curve Analysis (DCA), using the Net Benefit (NB).

Methods: Prospective cohort data ($n = 170$) of two merged randomized trials with workers with LBP on sick-leave, treated with Usual Care (UC) were used for the analyses. An existing prediction model for chronic LBP with the variables 'a clinically relevant change in pain intensity and disability status in the first 3 months', 'baseline measured pain intensity' and 'kinesiophobia' was compared with the same model without the variable 'kinesiophobia' using the NB and DCA. **Results:** Both prediction models showed an equal performance according to the DCA and NB. Between 10 and 95% probability thresholds of chronic LBP risk, both models were of clinically benefit. There were virtually no differences between both models in the improved classification of true positive (TP) patients. **Conclusions:** This study showed that the variable kinesiophobia, which was originally included in a prediction model for chronic LBP, was not informative to predict chronic LBP by using DCA. DCA and NB have to be used more often to develop clinically beneficial prediction models in workers because they are more sensitive to evaluate the discriminate ability of prediction models.

Panken et al. 2020.

BMC Musculoskeletal Disorders, vol. 12, no. 1.

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Keywords: Decision curve analysis; Kinesiophobia; Low Back pain; Prediction model; Prognosis

Evidence Level: 4A

Link: <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-020-3186-8>

Men and women's occupational activities and the risk of developing osteoarthritis of the knee, hip, or hands: a systematic review and recommendations for future research

Objective: To systematically review the evidence for an increased risk of osteoarthritis in the hip, knee, hand, wrist, finger, ankle, foot, shoulder, neck, and spine related to diverse occupational activities of men and women and to examine dose-response information related to the frequency, intensity, and duration of work exposures and the risk of osteoarthritis (OA). **Methods:** Established guidelines for systematic reviews in occupational health and safety studies were followed. MEDLINE, Embase, CINAHL, and Cochrane Library were searched from inception to December 2017. Studies were reviewed for relevance, quality was appraised, and data were extracted and synthesized. **Results:** Sixty-nine studies from 23 countries yielded strong and moderate evidence for lifting, cumulative physical loads, full-body vibration, and kneeling/squatting/bending as increasing the risks of developing OA in men and women. Strong and moderate evidence existed for no increased risk of OA related to sitting, standing, and walking (hip and knee OA), lifting and carrying (knee OA), climbing ladders (knee OA), driving (knee OA), and highly repetitive tasks (hand OA). Variability in dose-response data resulted in an inability to synthesize these data. **Conclusion:** Evidence points to the potential for OA occupational recommendations and practice considerations to be developed for women and men. However, research attention is needed to overcome deficits in the measurement and recall of specific work activities so that recommendations and practice considerations can provide the specificity needed to be adopted in workplaces.

Gignac et al. 2020.

Arthritis Care and Research, vol. 72, no. 3.

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Keywords: Osteoarthritis; Occupational activities; Knee; Hip; Hands, Risk

Evidence Level: 1A

Link: <https://onlinelibrary.wiley.com/doi/full/10.1002/acr.23855>

Digital care for chronic musculoskeletal pain: a 10,000 user longitudinal observational study

Background: Chronic musculoskeletal pain has a vast global prevalence and economic burden. Conservative therapies are universally recommended but require patient engagement and self-management to be effective. **Objective:** To evaluate the efficacy of a 12-week digital care pathway (DCP) in a large population of patients with chronic knee and back pain. **Methods:** A longitudinal observational study using a remote DCP available through employers using a mobile application. Subjects participated in a 12-week multi-modal DCP administered via a mobile app incorporating education, sensor-guided exercise therapy, and behavioral health support with 1-on-1 remote health coaching. Primary outcome was visual analogue scale (VAS) pain. Secondary measures included engagement levels, program completion, program satisfaction, condition-specific pain measures, depression, anxiety, and work productivity. **Results:** 10,264 adults with either knee (n=3796) or low back (n=6468) pain for at least three months were included in the study. Participants experienced 68.45% average improvement in VAS pain between baseline intake and 12 weeks. 73.1% of all participants completed the DCP into the final month. 78.6% of program completers (69.6% of all participants) achieved minimally important change in pain. Furthermore, the number of exercise therapy sessions and coaching interactions were both positively associated with improvement in pain, supporting that the amount of engagement influenced outcomes. Secondary outcomes included 57.9% and 58.3% decrease in depression and anxiety scores, respectively, and 61.5% improvement in work productivity. Lastly, three distinct clusters of pain response trajectories were identified which could be predicted with mean 76% accuracy using baseline measures. **Conclusions:** These results support the efficacy and scalability of a DCP for chronic low back and knee pain in a large, diverse, real-world population. Participants demonstrated high completion and engagement rates, and a significant positive relationship between engagement and pain reduction was identified, a finding which has not been previously demonstrated in a DCP. Furthermore, the large sample size allowed for identification of distinct pain response subgroups

which may prove beneficial in predicting recovery and tailoring future interventions. This is the first longitudinal digital health study to analyze pain outcomes in a sample of this magnitude, and it supports the prospect for DCPs to serve the overwhelming number of musculoskeletal pain sufferers worldwide.

Bailey et al. 2020.

Journal of Medical Internet Research.

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Keywords: Musculoskeletal pain; Chronic pain; Digital care; Therapy

Evidence Level: 4A

Link: <https://preprints.jmir.org/preprint/18250/accepted>

Ergonomics

Association between physical work demands and work ability in workers with musculoskeletal pain: cross-sectional study

Background: Musculoskeletal pain is common in the working population and may affect the work ability, especially among those with high physical work demands. This study investigated the association between physical work demands and work ability in workers with musculoskeletal pain. **Methods:** Workers with physically demanding jobs (n = 5377) participated in the Danish Work Environment Cohort Study in 2010. Associations between physical work ability and various physical work demands were modeled using cumulative logistic regression analyses while controlling for possible confounders. **Results:** In the fully adjusted model, bending and twisting/turning of the back more than a quarter of the workday (reference: less than a quarter of the workday) was associated with higher odds of lower work ability in workers with low-back pain (OR: 1.38, 95% CI: 1.09-1.74) and neck-shoulder pain (OR: 1.29, 95% CI: 1.01-1.64). When adding up the different types of demands, being exposed to two or more physical work demands for more than a quarter of the workday was consistently associated with lower work ability. **Conclusions:** Work that involves high demands of the lower back seems especially problematic in relation to work ability among physical workers with musculoskeletal pain. Regardless of the specific type of physical work demand, being exposed to multiple physical work demands for more than a quarter of the workday was also associated with lower work ability.

Skovlund et al. 2020.

BMC Musculoskeletal Disorders, vol. 21, no. 1.

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Keywords: Ergonomics; Musculoskeletal disease; Occupational medicine; Physical work; Sustainable employment; Work ability; Workplace

Evidence Level: 4A

Link: <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-020-03191-8>

Measuring biomechanical risk in lifting load tasks through wearable system and machine-learning approach

Ergonomics evaluation through measurements of biomechanical parameters in real time has a great potential in reducing non-fatal occupational injuries, such as work-related musculoskeletal disorders. Assuming a correct posture guarantees the avoidance of high stress on the back and on the lower extremities, while an incorrect posture increases spinal stress. Here, we propose a solution for the recognition of postural patterns through wearable sensors and machine-learning algorithms fed with kinematic data. Twenty-six healthy subjects equipped with eight wireless inertial measurement units (IMUs) performed manual material handling tasks, such as lifting and releasing small loads, with two postural patterns: correctly and incorrectly. Measurements of kinematic parameters, such as the range of motion of lower limb and lumbosacral joints, along with the displacement of the trunk with respect to the pelvis, were estimated from IMU measurements through a biomechanical model. Statistical differences were found for all kinematic parameters between the correct and the incorrect postures ($p < 0.01$). Moreover, with the weight increase of load in the lifting task, changes in hip and trunk kinematics were observed ($p < 0.01$). To automatically identify the two postures, a supervised machine-learning algorithm, a support vector machine, was trained, and an accuracy of 99.4% (specificity of 100%) was reached by using

the measurements of all kinematic parameters as features. Meanwhile, an accuracy of 76.9% (specificity of 76.9%) was reached by using the measurements of kinematic parameters related to the trunk body segment.

Conforti et al. 2020.

Sensors, vol. 20, no. 6.

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Keywords: Activity recognition; Machine-learning algorithms; Motion analysis; Musculoskeletal disorders; Risk assessment; Wearable sensors; Working activities

Evidence Level: 5A

Link: <https://www.mdpi.com/1424-8220/20/6/1557>

Work Health and Safety

Decade of fatal injuries in workers in New Zealand: insights from a comprehensive national observational study

Introduction: Current priorities and strategies to prevent work-related fatal injury (WRFI) in New Zealand (NZ) are based on incomplete data capture. This paper provides an overview of key results from a comprehensive 10-year NZ study of worker fatalities using coronial records. **Methods:** A data set of workers, aged 15-84 years at the time of death who died in the period 2005-2014, was created using coronial records. Data collection involved: (1) identifying possible cases from mortality records using selected external cause of injury codes; (2) linking these to coronial records; (3) retrieving and reviewing records for work-relatedness; and (4) coding work-related cases. Frequencies, percentages and rates were calculated. Analyses were stratified into workplace and work-traffic settings. **Results:** Over the decade, 955 workers were fatally injured, giving a rate of 4.8 (95% CI 5.6 to 6.3) per 100 000 worker-years. High rates of worker fatalities were observed for workers aged 70-84 years, indigenous Māori and for males. Workers employed in mining had the highest rate in workplace settings while transport, postal and warehousing employees had the highest rate in work-traffic settings. Vehicle-related mechanisms dominated the mechanism and vehicles and environmental agents dominated the breakdown agencies contributing to worker fatalities. **Discussion:** This study shows the rates of worker fatalities vary widely by age, sex, ethnicity, occupation and industry and are a very serious problem for particular groups. Future efforts to address NZ's high rates of WRFI should use these findings to aid understanding where preventive actions should be prioritised.

Lilley et al. 2020.

Injury Prevention: Journal of the International Society for Child and Adolescent Injury Prevention.

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Keywords: Driver; Epidemiology; Mortality; Occupational injury; Workplace

Evidence Level: 4A

Link: <https://injuryprevention.bmj.com/content/early/2020/03/24/injuryprev-2020-043643.long>

Understanding the sociocognitive process of construction workers' unsafe behaviours: An agent-based modelling approach

Previous literature has recognized that workers' unsafe behavior is the combined result of both isolated individual cognitive processes and their interaction with others. Based on the consideration of both individual cognitive factors and social organizational factors, this paper aims to develop an Agent-Based Modeling (ABM) approach to explore construction workers' sociocognitive processes under the interaction with managers, coworkers, and foremen. The developed model is applied to explore the causes of cognitive failure of construction workers and the influence of social groups and social organizational factors on the workers' unsafe behavior. The results indicate that (1) workers' unsafe behaviors are gradually reduced with the interaction with managers, foremen, and workers; (2) the foreman is most influential in reducing workers' unsafe behaviors, and their demonstration role can hardly be ignored; (3) the failure of sociocognitive process of construction workers is affected by many factors, and cognitive process errors could be corrected under social norms; and (4) among various social organizational factors, social identity

has the most obvious effect on reducing workers' unsafe behaviors, and preventive measures are more effective than reactive measures in reducing workers' unsafe behaviors.

Ye et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 5.

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Keywords: Agent-based modeling; Construction worker; Social groups; Social interaction; Social organizational factors; Sociocognitive process; Unsafe behaviors

Evidence Level: 6A

Link: <https://www.mdpi.com/1660-4601/17/5/1588>

Abuse of licit and illicit psychoactive substances in the workplace: medical, toxicological, and forensic aspects

About one-third of adult life is spent in the workplace. The use of psychoactive substances is a major preventable cause of morbidity and mortality. The consumption of psychoactive substances during or outside working hours greatly increases the frequency and severity of labor accidents, as well as the workers' poor general state of health and productivity, implying higher costs for enterprises. It is the responsibility of organizations to ensure the safety and health of their workers. These cannot be limited to traditional routine clinical exams, as other aspects also have an impact on health. Thus, prevention and intervention in the consumption of psychoactive substances (e.g., ethanol, opioids, central nervous system stimulants or depressants, hallucinogens, Cannabis derivatives, dissociative substances, and inhalants) in labor activity should be considered as an investment of organizations and not as a cost, in view of the professional, personal, and family advantages for workers and employers, with a potential impact on productivity, security, health, and quality of life at work. Despite the extensive literature on the subject, each article generally focuses on one or another aspect of a very specific nature, not tackling the problem in a holistic way by confronting clinical, safety, and legal issues. This article presents a reflection on the legal, laboratorial, clinical, ethical, forensic, and safety concerns related to the consumption of psychoactive substances in the workplace, and can be a cross-cutting contribution to occupational medicine, forensic medicine, and insurance medicine, as well as for entrepreneurs, lawyers, judges, workers, and technicians from the public and private sectors that develop projects in this area. This discussion is based on general principles established internationally and highlights the role of the occupational healthcare system and other decision-making actors in the prevention and supervision of workplace psychoactive consumption.

Dinis-Oliveira et al. 2020.

Journal of Clinical Medicine, vol. 9, no. 3.

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Keywords: Clinical; Ethics; Forensic; Forensic medicine; Insurance medicine; Law; Occupational medicine; Psychoactive substances; Safety

Evidence Level: 6A

Link: <https://www.mdpi.com/2077-0383/9/3/770>

Risk Assessment

Characterising the burden of work-related injuries in South Australia: a 15-Year data analysis

To characterise the burden of work-related injuries in South Australia, workers' compensation claim data were obtained from SafeWork South Australia between 2000 and 2014. Descriptive analyses were performed to investigate the burden of work-related injuries by age, gender, occupation, industry, and nature and mechanism of injury. Dunn's test was used to compare the injury costs and working days lost by industry and occupation. Ordinary linear regression was used to investigate the age-injury cost association. A total of 464,139 workers' compensation claims were reported during the 15-year period in South Australia, with an overall rate of 4.6 claims per 100 employees, resulting in a total of 20,861,001 working days lost and AU\$14.9 billion dollars of compensation payment. Between 2000 to 2014, the annual claim rates, compensation payments, working days lost, and number of work-related death reduced by 59.3, 73.8, 87.1, and 78.6 percent, respectively, while the median compensation payment increased by 67.3% from AU\$968 to AU\$1620. A 1-year increase in age was associated with a 2.1% (Rate Ratio, RR = 1.021, 95%

CI: 1.020-1.022) increase in compensation costs and a 1.3% (RR = 1.013, 95% CI: 1.012-1.020) increase in working days lost. Work-related injury rates are declining in most sectors, however some workers, especially young male technicians and labourers in the community services industry, remain at higher risk. Challenges for workers' health and safety include the aging labour force, vehicle incidents, and severe injuries among new and foreign-born workers.

Xiang et al. 2020.

International Journal of Environmental Research and Public Health, vol. 17, no. 6.

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Keywords: South Australia; Injury claim; Occupational injury; Workers' compensation

Evidence Level: 4A

Link: <https://www.mdpi.com/1660-4601/17/6/2015>

Risk factors for the number of sustained injuries in artisanal and small-scale mining operation

Background: The relationship between risk factors and likelihood of occupational injury has been studied. However, what has been published has only provided a limited explanation of why some of the employees working in the same environment as other employees suffered a single-injury event, while other employees experienced multiple-injury events. This article reports on an investigation of whether artisanal and small-scale miners in Migori County of Kenya are susceptible to a single-injury or multiple-injury incidences, and if so, what underpinning parameters explain the differences between the single incident injured and the multiple incident injured group. Mine management commitment to safety in artisanal and small-scale mining (ASM) operations is also considered. **Materials and Methods:** The research objectives were achieved by surveying 162 uninjured and 74 injured miners. A structured, closed-end questionnaire was administered to participants after the stratification of the study population and systematic selection of the representative samples. **Results:** The results showed that most injured miners suffer a single-injury incident rather than experiencing multiple-injury events, and laceration (28.40%) was the common injury suffered by the miners. The analysis showed that the risk factors for the single incident injured group were not similar to those in the multiple incident injured group. The research also found mine workers have low opinion about mine management/owners commitment to safety. **Conclusion:** The study concluded that mine management and miners need to be educated and sensitized on the dangers of this operation. Provision of safety gears and positive safety culture must be a top priority for management.

Ajith et al. 2020.

Safety and Health at Work, vol. 11, no. 1.

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Keywords: Incidence; Logistic model; Miners; Occupational injuries; Risk factors

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S2093791119304007?via%3Dihub>

Years of life lost by CNCD attributed to occupational hazards in Brazil: GBD 2016 study

Objective: To assess the years of life lost due to premature death and disability-adjusted life years (DALY) as a result of chronic noncommunicable diseases attributable to occupational hazard factors, and to compare their position according to the risk ranking for chronic noncommunicable diseases in 1990 and 2016. **Methods:** Data for the DALY indicator, estimated from the Global Burden of Disease 2016 (GBD 2016) study, were analyzed for noncommunicable chronic diseases attributable to occupational, and other risk factors, selected in Brazil. A descriptive analysis was performed comparing the proportion of DALY by sex and age group (15 to 49 and 50 to 69 years old), as well as the ranking of occupational hazard factors in 1990 and 2016. **Results:** In 2016, ergonomic risk factors, carcinogenic agents, and noise in the workplace were among the 25 largest contributors to DALY for chronic noncommunicable diseases affecting the age group between 15 and 49 years. The contribution of all occupational hazard factors increased in 2016, except for occupational aerodispersoids affecting men. Concerning the age group between 50 and 69, occupational carcinogens stand out, with an increase of 26.0% for men, and 17.1% for women in 2016. Risk factors evaluated according to their 1990 and 2016 ranking show that occupational hazards have all scored higher on the second evaluation (2016), especially when compared with other risks. **Conclusions:** The global burden of chronic noncommunicable diseases attributed to occupational hazard factors has become

increasingly important. We suggest the strengthening of the approach of occupational hazard factors in the agendas for tackling these diseases in Brazil.

Assunção et al. 2020.

Revista de Saude Publica.

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Keywords: Noncommunicable diseases; Chronic diseases; Occupational hazards; Premature death

Evidence Level: 5B

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7069713/>

Occupational Exposure

Global and regional burden of cancer in 2016 arising from occupational exposure to selected carcinogens: a systematic analysis for the Global Burden of Disease Study 2016

Objectives: This study provides a detailed analysis of the global and regional burden of cancer due to occupational carcinogens from the Global Burden of Disease 2016 study. **Methods:** The burden of cancer due to 14 International Agency for Research on Cancer Group 1 occupational carcinogens was estimated using the population attributable fraction, based on past population exposure prevalence and relative risks from the literature. The results were used to calculate attributable deaths and disability-adjusted life years (DALYs). **Results:** There were an estimated 349 000 (95% Uncertainty Interval 269 000 to 427 000) deaths and 7.2 (5.8 to 8.6) million DALYs in 2016 due to exposure to the included occupational carcinogens-3.9% (3.2% to 4.6%) of all cancer deaths and 3.4% (2.7% to 4.0%) of all cancer DALYs; 79% of deaths were of males and 88% were of people aged 55 -79 years. Lung cancer accounted for 86% of the deaths, mesothelioma for 7.9% and laryngeal cancer for 2.1%. Asbestos was responsible for the largest number of deaths due to occupational carcinogens (63%); other important risk factors were second-hand smoke (14%), silica (14%) and diesel engine exhaust (5%). The highest mortality rates were in high-income regions, largely due to asbestos-related cancers, whereas in other regions cancer deaths from second-hand smoke, silica and diesel engine exhaust were more prominent. From 1990 to 2016, there was a decrease in the rate for deaths (-10%) and DALYs (-15%) due to exposure to occupational carcinogens. **Conclusions:** Work-related carcinogens are responsible for considerable disease burden worldwide. The results provide guidance for prevention and control initiatives.

GBD 2016 Occupational Carcinogens Collaborators 2020.

Occupational and Environmental Medicine, vol. 77, no. 3.

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Keywords: Asbestos; Diesel engine exhaust; Epidemiology; Occupational exposure; Silica

Evidence Level: 4A

Link: <https://oem.bmj.com/content/77/3/151.long>

Lead and mercury exposure and related health problems in metal artisan workplaces and high-risk household contacts in Thimphu, Bhutan

Background: Metal artisans have been using lead and mercury in their settings for centuries. Exposure to these toxic heavy metals causes adverse health effects. We assessed the occupational exposure of metal artisans and their high-risk household contacts at Thimphu, Bhutan. **Methods:** A cross-sectional study in which 134 metal artisan centre employees and 48 high-risk household contacts were tested for blood lead and mercury levels. Sociodemographic data, occupational exposure risk factors, and clinical syndrome related to lead and mercury exposure were further obtained and analysed using EpiInfo 7.0. **Results:** The mean age of the metal artisan centre employees was 36.02 ± 10.3 . The prevalence of elevated blood lead and mercury level was 38.4% and 51.9%, respectively. Significantly higher prevalence of mercury level was observed among the artisans compared to nonartisans (66.97 vs, 16.0). Among three centres, the goldsmith section of the Department of National Properties had the highest (94.1%). Profession as an artisan, mould designing, performing gold amalgamation, working for >8 hours a day, working for >5 years, and working at home were significant risk factors associated with elevated blood mercury level. Significant association was observed between elevated mercury level and complaints of burning or watery eyes ($p=0.001$), anxiety, nervousness, irritability, severe shyness ($p=0.001$), anxiety, nervousness, irritability, severe shyness

($p=0.001$), anxiety, nervousness, irritability, severe shyness ($p=0.001$), anxiety, nervousness, irritability, severe shyness ($p=0.029$), muscle aches ($p=0.019$), and stomach cramps or pain ($p=0.009$). **Conclusion:** The prevalence of elevated blood mercury level is concerning among the artisans. Advocacy, proper usage of personal protective equipment, awareness on chemical safety, and hazard associated with lead and mercury usage are needed to minimize the exposure.

Monger et al. 2020.

The Scientific World Journal, vol. 10.

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Keywords: Mercury; Lead; Metal; Exposure; Health; Workplace

Evidence Level: 4B

Link: <https://www.hindawi.com/journals/tswj/2020/9267181/>

Spatial changes in work capacity for occupations vulnerable to heat stress: potential regional impacts from global climate change

Background: As the impact of climate change intensifies, exposure to heat stress will grow, leading to a loss of work capacity for vulnerable occupations and affecting individual labor decisions. This study estimates the future work capacity under the Representative Concentration Pathways 8.5 scenario and discusses its regional impacts on the occupational structure in the Republic of Korea. **Methods:** The data utilized for this study constitute the local wet bulb globe temperature from the Korea Meteorological Administration and information from the Korean Working Condition Survey from the Occupational Safety and Health Research Institute of Korea. Using these data, we classify the occupations vulnerable to heat stress and estimate future changes in work capacity at the local scale, considering the occupational structure. We then identify the spatial cluster of diminishing work capacity using exploratory spatial data analysis. **Results:** Our findings indicate that 52 occupations are at risk of heat stress, including machine operators and elementary laborers working in the construction, welding, metal, and mining industries. Moreover, spatial clusters with diminished work capacity appear in southwest Korea. **Conclusion:** Although previous studies investigated the work capacity associated with heat stress in terms of climatic impact, this study quantifies the local impacts due to the global risk of climate change. The results suggest the need for mainstreaming an adaptation policy related to work capacity in regional development strategies.

Kim et al. 2020.

Safety and Health at Work, vol. 11, no. 1.

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Keywords: Climate change adaptation; Exploratory spatial data analysis; Labor productivity; Work capacity; Working conditions

Evidence Level: 5B

Link: <https://www.sciencedirect.com/science/article/pii/S2093791119303890?via%3Dihub>

Prevalence of respiratory symptoms and spirometric changes among non-smoker male wood workers

Objective: To assess the effects of workplace exposure to hardwood dust on lung function and determine a prevalence of respiratory symptoms among wood workers. **Study Design:** Cross-sectional observational study. **Setting:** Tertiary referral center. **Subjects and Methods:** Two hundred seventy-six, non-smoker male wood workers and equal number of non-smoker male office workers, referred to pulmonology clinic included in this study. Evaluation of study participants included completion of a questionnaire regarding respiratory symptoms and baseline spirometry was measured according to the actual recommendations. **Results:** Respiratory symptoms including cough, phlegm, chest tightness, and wheezing were significantly higher in wood workers than office workers (40.2% versus 29.3% for cough, $p = 0.0073$; 40.6% versus 23.6% for phlegm, $p < 0.0001$; 38.0% versus 23.1% for chest tightness, $p = 0.0001$; 25.3% versus 14.5% for wheezing, $p = 0.0014$). No statistically significant differences were observed for Dyspnea, and upper respiratory tract symptoms among wood workers compared to office workers. While wood workers were more likely to require spirometry test than office workers (21.4% versus 5.4%, $p < 0.001$) the obstructive changes were more prevalent on spirometry test in wood workers (71.4% obstructive pattern versus 28.6% restrictive pattern). Spirometry test revealed the mean values of FEV1 and FEV1/FVC ratio were significantly lower in the wood workers, compared to their mean values in the control group. **Conclusion:**

Respiratory symptoms associated with work, are more prevalent among wood workers than office workers. Our data revealed that workplace exposure to hardwood dust may compromise respiratory function, indicating the importance and the need for optimizing preventive measures in workplace to protect the respiratory health among exposed workers. Obstructive changes on pulmonary function test is a dominant pathologic pattern in pulmonary function test among wood workers. Further investigation is required by current available tools such as nasal cytology to detect influence of wood dust exposure on the upper respiratory airway.

Hosseini et al. 2020.

PLoS One, vol. 15, no. 3.

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Keywords: Lung function; Respiratory; Wood workers; Workplace exposure; Smoker

Evidence Level: 4A

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0224860>

Environmental monitoring of PAHs exposure, biomarkers and vital status in coke oven workers

A follow-up study of a cohort of workers from a coke plant compared with a control group from the same industrial area was conducted in 2019. The recruitment and environmental and biomarker measurements were performed during 1993/1994. The environmental concentrations of polycyclic aromatic hydrocarbons (PAH), B(a)P, pyrene and nitro-PAH were measured. Personal data were collected via an individual semi-structured questionnaire by a trained physician. All biomarkers were measured after a specific blood drawing for every test. Significant risks (ORs) were observed for nitro-PAH ($\geq 0.12 \mu\text{g}/\text{m}^3$) [OR = 7.96 (1.01-62.82)], urinary 1-hydroxypyrene (1-OHpy) ($\geq 0.99 \mu\text{moles}/\text{moles}$ of creatinine) [OR = 11.71 (1.47-92.90)], PAH DNA adducts (P32) (≥ 2.69 adducts/108 nucleotides) [OR = 5.46 (1.17-25.58)], total nitro-PAH hemoglobin adducts ($\geq 161.68 \text{ fg}/\mu\text{g}$ of Hb) [OR = 5.92 (1.26-27.86)], sister chromatid exchange (SCE) with TCR (≥ 377.84 SCE/cell chromosomes) [OR = 13.06 (3.95-93.10)], sister chromatid exchange with T (≥ 394.72 total SCE) [OR = 13.06 (3.95-93.10)], and sister chromatid exchange with X (≥ 8.19 mean SCE) [OR = 13.06 (3.95-93.10)]. Significant risk of death for all causes and chromosomal aberrations (48 h) (OR = 7.19 [1.19-43.44]) or micronuclei in culture at 48 h (OR = 3.86 [1.04-14.38]) were also found.

Vimercati et al. 2020.

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

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Keywords: Biomarkers; Cohort; Coke plant; Occupational exposure; Sister chromatid exchange; Total nitro-PAH hemoglobin adducts; Urinary 1-hydroxypyrene (1-OHpy), PAH DNA adducts; Vital status

Evidence Level: 5B

Link: <https://www.mdpi.com/1660-4601/17/7/2199>

Asbestosis and Mesothelioma

Silica and asbestos exposure at work and the risk of bladder cancer in Canadian men: a population-based case-control study

Background: Silica and asbestos are recognized lung carcinogens. However, their role in carcinogenesis at other organs is less clear. Clearance of inhaled silica particles and asbestos fibers from the lungs may lead to translocation to sites such as the bladder where they may initiate carcinogenesis. We used data from a Canadian population-based case-control study to evaluate the associations between these workplace exposures and bladder cancer. **Methods:** Data from a population-based case-control study were used to characterize associations between workplace exposure to silica and asbestos and bladder cancer among men. Bladder cancer cases (N = 658) and age-frequency matched controls (N = 1360) were recruited within the National Enhanced Cancer Surveillance System from eight Canadian provinces (1994-97). Exposure concentration, frequency and reliability for silica and asbestos were assigned to each job, based on lifetime occupational histories, using a combination of job-exposure profiles and expert review. Exposure was modeled as ever/never, highest attained concentration, duration (years), highest attained frequency (% worktime) and cumulative exposure. Odds ratios (OR) and their 95% confidence intervals (CI) were estimated using adjusted logistic regression. **Results:** A modest (approximately 20%) increase in bladder

cancer risk was found for ever having been exposed to silica, highest attained concentration and frequency of exposure but this increase was not statistically significant. Relative to unexposed, the odds of bladder cancer were 1.41 (95%CI: 1.01-1.98) times higher among men exposed to silica at work for ≥ 27 years. For asbestos, relative to unexposed, an increased risk of bladder cancer was observed for those first exposed ≥ 20 years ago (OR:2.04, 95%CI:1.25-3.34), those with a frequency of exposure of 5-30% of worktime (OR:1.45, 95%CI:1.06-1.98), and for those with < 10 years of exposure at low concentrations (OR:1.75, 95%CI:1.10-2.77) and the lower tertile of cumulative exposure (OR:1.69, 95%CI:1.07-2.65). However, no clear exposure-response relationships emerged. **Conclusions:** Our results indicate a slight increase in risk of bladder cancer with exposure to silica and asbestos, suggesting that the effects of these agents are broader than currently recognized. The findings from this study inform evidence-based action to enhance cancer prevention efforts, particularly for workers in industries with regular exposure.

Latifovic et al. 2020.

BMC Cancer, vol. 20, no. 1.

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Keywords: Asbestos; Bladder cancer; Case-control study; Expert assessment; Occupational cancer risk factors; Silica

Evidence Level: 5A

Link: <https://bmccancer.biomedcentral.com/articles/10.1186/s12885-020-6644-7>