

**IWH Research Alert**  
**November 1, 2019**

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**Al-Mohannadi AS, Sayegh S, Ibrahim I, Salman A, and Farooq A. Effect of a pedometer-based walking challenge on increasing physical activity levels amongst hospital workers. Archives of Public Health. 2019; 77:40.**

<https://doi.org/10.1186/s13690-019-0368-7> [open access]

**Abstract:** Background: More than 50% of Qatari adults are physically inactive. The workplace is an excellent environment to implement cost-effective, efficient behavioural physical activity (PA) interventions to increase PA. This study evaluated whether a pedometer-based walking challenge would increase PA levels amongst hospital workers. Methods: A pedometer-based workplace walking intervention was implemented in April-August 2017. Amongst 800 recruited full-time hospital workers, a cross-sectional sample of 212 workers completed the online questionnaires Quality of Life Questionnaire, International Physical Activity Questionnaire (IPAQ), and Workforce Sitting Questionnaire. A sub-sample of participants ( $n = 54$ ) wore a pedometer for 3 months. They recorded their daily step count through an online web platform linked to the pedometer. Another cross-sectional sample ( $n = 194$ ) in the same target population completed online questionnaires at post intervention. Results: The IPAQ assessed physical activity at post-intervention was higher compared to pre-intervention. In a sub-sample ( $n = 54$ ) that

provided pedometer data, workers' step count during intervention was significantly higher (9270) from pre-intervention (7890) ( $p = 0.048$ ). Conclusions: Although self-reported PA was higher post-intervention, the subsample showed objectively assessed physical activity did not exceed the threshold recommended for optimal health. Therefore, encouraging participation and maintaining motivation amongst workers in a work-based PA programme is challenging

**Buruck G, Tomaschek A, Wendsche J, Ochsmann E, and Dorfel D. Psychosocial areas of worklife and chronic low back pain: a systematic review and meta-analysis. BMC Musculoskeletal Disorders. 2019; 20(1):480.**

<https://doi.org/10.1186/s12891-019-2826-3> [open access]

Abstract: BACKGROUND: The aim of this review was to synthesize the evidence on the potential relationship between psychosocial work factors from the Areas of Worklife (AW) model (workload, job control, social support, reward, fairness, and values) and chronic low back pain (CLBP; unspecific pain in the lumbar region lasting 3 months or longer). METHODS: We conducted a systematic literature search of studies in Medline, PsycINFO, Web of Science, and CINAHL (1987 to 2018). Three authors independently assessed eligibility and quality of studies. In this meta-analysis, we pooled studies' effect sizes using a random-effects model approach and report sample size weighted mean Odds Ratios (ORs). RESULTS: Data from 18 studies ( $N = 19,572$ ) was included in the analyses. We found no studies investigating associations between fairness or values and CLBP. CLBP was significantly positively related to workload ( $OR = 1.32$ ) and significantly negatively related to overall job control ( $OR = 0.81$ ), decision authority ( $OR = 0.72$ ), and two measures of social support ( $ORs = 0.75$  to  $0.78$ ), even in prospective studies. Skill discretion and reward did not significantly relate to CLBP. Moderation analyses revealed several variables (e.g., exposure time, mean age and sex) affecting these relationships. CONCLUSIONS: Our results support employees' workload, job control, and social support as predictors of CLBP. In this line, these work factors should be considered when developing programs to prevent chronic low back pain. Future studies should apply measures of CLBP that are more precise, and investigate the full areas of work life (AW) factors in combination

**Choi YG, Choi BJ, Park TH, Uhm JY, Lee DB, Chang SS, et al. A study on the characteristics of Maslach Burnout Inventory-General Survey (MBI-GS) of workers in one electronics company. Annals of Occupational and Environmental Medicine. 2019; 31(1):e29.**

<https://doi.org/10.35371/aoem.2019.31.e29> [open access]

**Background:** This study investigated characteristics according to demographic, occupational factors of Maslach Burnout Inventory-General Survey (MBI-GS) and related scales to MBI-GS. **Methods:** The subjects of the study were 3,331 workers in 3 different workplaces of one electronics company. They filled in demographic factors surveys, occupational factors surveys, MBI-GS, Korean Occupational Stress Scale-Short Form (KOSS-SF), Patient Health Questionnaire-9 (PHQ-9), and World Health Organization Quality Of Life-Abbreviated version (WHOQOL-BREF). The correlations between sub-scales of MBI-GS and KOSS-SF, PHQ-9, WHOQOL-BREF were analyzed respectively. And KOSS-SF, PHQ-9, and WHOQOL-BREF were categorized; mean scores of sub-scales of MBI-GS were compared; and the quartiles of sub-scales of MBI-GS were presented. **Results:** A comparison of mean scores of MBI-GS according to demographic and occupational factors showed a significant difference according to age, problem drinking behavior, working time, and working duration in exhaustion regardless of sex. In professional efficacy, a significant difference was observed in age, marital status, working type, and working duration. And as a result of correlation analysis, the correlation coefficient between exhaustion and PHQ-9 was the highest regardless of sex. In addition, regardless of sex, exhaustion and cynicism scores tended to increase and professional efficacy score tended to decrease as the work stress level rose. Same tendency is shown in case of the more severe the symptom of depression and the lower quality of life. When the quartile for sub-scales' score of MBI-GS were investigated, the burnout was more pronounced in female than in male. **Conclusions:** Many demographic and occupational factors affect burnout were identified in one electronics company, and we investigated which sub-scales of MBI-GS were affected. Through this study, burnout characteristics were identified in a few population group of Korea, and the results are expected to be useful for burnout risk group identification, counseling, etc.



**Corrigan S, Kay A, Ryan M, Ward ME, and Brazil B. Human factors and safety culture: challenges and opportunities for the port environment. Safety Science. 2019; 119:252-265.**

<https://doi.org/10.1016/j.ssci.2018.03.008>

**Engel J, van Kampen V, Gering V, Hagemeyer O, Bruning T, Raulf M, et al. Non-invasive tools beyond lung function before and after specific inhalation challenges for diagnosing occupational asthma. International Archives of Occupational & Environmental Health. 2019; 92(7):1067-1076.**

<https://doi.org/10.1007/s00420-019-01439-y>

Abstract: PURPOSE: Increases of fractional exhaled nitric oxide (FeNO), sputum eosinophils, and methacholine responsiveness have been described after specific inhalation challenges (SIC) with occupational allergens, but limited information is available about their comparative performance. It was the aim of the study to assess the diagnostic accuracy of these non-invasive tests before and after SIC for the diagnosis of occupational asthma (OA). METHODS: A total of 122 subjects with work-related shortness of breath were included. The 'gold standard' was defined as airway obstruction (pulmonary responders) and/or an increase of FeNO of at least 13 ppb after SIC. The results were compared with those obtained using the pulmonary responder status alone as 'gold standard'. RESULTS: If the pulmonary responder status and/or an increase of FeNO was used as 'gold standard' for SIC, 28 out of 39 positives (72%), but also 20 out of 83 negatives (24%) showed an increase of sputum eosinophils and/or bronchial hyperresponsiveness after SIC. If the pulmonary responder status alone was used as 'gold standard', an increase of FeNO with a sensitivity of 0.57 and a specificity of 0.82 showed a higher accuracy than increases of sputum eosinophils (0.52/0.75) or bronchial hyperresponsiveness (0.43/0.87). Individual case analyses suggest that a few cases of OA may be detected by increases of sputum eosinophils or bronchial hyperresponsiveness alone, but probably false-positive tests dominate. CONCLUSION: It is recommended to use both lung function and increase of FeNO as primary effect parameters of SIC. Changes of sputum eosinophils and bronchial hyperresponsiveness after SIC have a low additional diagnostic value, but may be useful in individual cases



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**Goode N, Newnam S, and Salmon PM. Musculoskeletal disorders in the workplace: development of a systems thinking-based prototype classification scheme to better understand the risks. Safety Science. 2019; 120:146-156.**

<https://doi.org/10.1016/j.ssci.2019.05.037>

**Hadzibajramovic E, Ahlborg Jr G, and Grimby-Ekman A. Concurrent and lagged effects of psychosocial job stressors on symptoms of burnout. International Archives of Occupational & Environmental Health. 2019; 92(7):1013-1021.**

<https://doi.org/10.1007/s00420-019-01437-0> [open access]

Abstract: PURPOSE: Burnout is a mental condition described as being a result of long-term stressors commonly related to psychosocial factors at work. The aim of the present study was to investigate longitudinal relationships between job demands, decision authority, effort and reward, and symptoms of burnout, as well as the joint effects of job demands and decision authority, and of effort and reward. METHODS: The data came from a four-wave longitudinal cohort study of Swedish health care workers. Longitudinal associations were analysed using mixed effects regression models with random intercept. RESULTS: The concurrent analysis showed that demand and decision authority, as well as effort and reward, were associated with symptoms of burnout over time. Evidence of the lagged effects of workplace factors on burnout symptoms was limited to reward. No clear effect modification was found. CONCLUSION: An increase in unfavourable working conditions implied increasing scores on the burnout measure over time. The concurrent effects of job demands, decision authority, effort and reward on symptoms of burnout were seen. The evidence of lagged effects was limited to the low-reward condition. Regularly monitoring these work environment conditions at workplaces can help identify risk situations for burnout and thus be useful in the prevention of work-related mental illness. Lastly, a new approach to defining the risk groups was proposed, which is consistent across different populations and time points

**Ikeda T, Sugiyama K, Aida J, Tsuboya T, and Osaka K. The contextual effect of area-level unemployment rate on lower back pain: a multilevel analysis of three consecutive surveys of 962,586 workers in Japan. International Journal of**



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**Environmental Research and Public Health.** 2019; 16:4016.

<https://doi.org/10.3390/ijerph16204016> [open access]

Abstract: This study examined the associations between area-level unemployment rates and lower back pain using large-scale data provided by the Japanese working population. We analyzed data from a nationally representative, repeated, cross-sectional study across three waves from 2010, 2013, and 2016 in 47 Japanese subnational level areas. Workers aged 18-64 years ( $n = 962,586$ ) were eligible to participate in the study. A multilevel logistic model was used to examine the association between the unemployment rate and lower back pain. The self-report of lower back pain was a dependent variable. The prefecture-level unemployment rate was analyzed as an independent variable, adjusted for individual-level covariates (e.g., gender, age, socioeconomic status). After adjusting for all covariates, the main effect of the prefecture-level unemployment rate was statistically significant: the odds ratio (OR) (95% credible interval (Crl)) was 1.01 (1.002, 1.03). Additionally, the OR (95% Crl) for the interaction between gender and the prefecture-level unemployment rate was 1.02 (1.01, 1.03) indicating that women were more affected by area-level employment status than men. In conclusion, a significant association between the unemployment rate and lower back pain was observed in the Japanese working population. Women were more sensitive to the unemployment rate

**Jones W, Gibb A, Haslam R, and Dainty A. Work-related ill-health in construction: the importance of scope, ownership and understanding. Safety Science.** 2019; 120:538-550.

<https://doi.org/10.1016/j.ssci.2019.07.038>

**Kim K, Cho S, and Paek D. Association of discrimination and presenteeism with cardiovascular disease: the Fourth Korean Working Conditions Survey. Annals of Occupational and Environmental Medicine.** 2019; 31(1):36.

<https://doi.org/10.35371/aoem.2019.31.e28> [open access]

Abstract: Background: Discrimination is a representative social determinant of health. Presenteeism is defined as presenting to work despite of illness and is an indicator of group health. We investigated the association of discrimination and presenteeism with cardiovascular disease using Korean data.



**Methods:** This study used the fourth Korea Working Conditions Survey (2014) data of 27,662 wage workers (employees). Presenteeism and discrimination related to age, sex, education, birth region, and employment type were ascertained. Self-reported cardiovascular disease was also assessed using the survey questionnaire. General and occupational characteristics found to be significant in univariate analyses were entered into a multivariate logistic regression analysis of the association of discrimination and presenteeism with cardiovascular disease. We also calculated the odds ratios of multiple discriminations and/or presenteeism for cardiovascular disease.

**Results:** In the univariate analyses, sex, age, education, monthly income, employment type, occupation, hours worked per week, workplace scale, and shift work were significantly associated with cardiovascular disease. A multivariate logistic regression analysis adjusted for general and occupational characteristics showed that discrimination and presenteeism were significantly associated with cardiovascular disease. Finally, the association with cardiovascular disease was strongest when both multiple discriminations and presenteeism were present.

**Conclusions:** Discrimination and presenteeism are associated with cardiovascular disease, and this association was stronger in the presence of multiple types of discrimination and presenteeism.

**Osterman C, Hult C, and Praetorius G. Occupational safety and health for service crew on passenger ships. Safety Science. 2020; 121:403-413.**

<https://doi.org/10.1016/j.ssci.2019.09.024>

**Peters CE, Kim J, Song C, Heer E, Arrandale VH, Pahwa M, et al. Burden of non-melanoma skin cancer attributable to occupational sun exposure in Canada. International Archives of Occupational & Environmental Health. 2019; 92(8):1151-1157.**

<https://doi.org/10.1007/s00420-019-01454-z>

**Abstract:** PURPOSE: Outdoor workers are exposed daily to solar ultraviolet radiation, an important contributor in the development of

non-melanoma skin cancer. This study aimed to quantify the health burden of non-melanoma skin cancers among outdoor workers in Canada. **METHODS:** Solar ultraviolet radiation exposure and estimates of exposure levels were applied to employment information from Canada census data to determine the exposed population in the risk exposure period (1961-2001). Risk estimates were drawn from meta-analyses selected based on quality and relevance to the current study. Population-attributable fractions were calculated using Levin's equation and attributable cases were estimated based on incidence data reported by the Canadian Cancer Society. **RESULTS:** In 2011, 6.31% (4556 cases) of non-melanoma skin cancer cases were estimated to be attributable to occupational exposure to solar ultraviolet radiation. The majority of these cases occurred in men in the agriculture or construction industries. **CONCLUSIONS:** These estimates of the burden of non-melanoma skin cancer in Canada identify the need for further prevention efforts, particularly in agriculture and construction. Introducing workplace sun safety measures could be an important area for policy development

**Ruttenberg R and Rice C. Assessing the impact of health and safety training: increased behavioral change and organizational performance. American Journal of Industrial Medicine. 2019; 62(11):986-995.**

<https://doi.org/10.1002/ajim.23026>

**Abstract:** **BACKGROUND:** Annual health and safety refresher training is mandated for workers in a number of employment sectors and also is used to maintain and enhance skills when not legally required.

**METHODS:** One year following training, hazardous waste worker training participants were asked if the training had been applied at their work or in the community, corresponding to Kirkpatrick levels of training evaluation. Likely response themes were drafted by the authors using qualitative data coding. **RESULTS:** Of the 1,726 refresher participants, 1,094 (63%) provided an entry. Eight theme categories were adapted from the originals, spanning the activities trainees reported as applications of their training: events, actions, awareness, emergency response, equipment, planning and standard operating procedures, training, and use of written resources.

**CONCLUSIONS:** Asking participants to reflect on how training has been applied provides an opportunity to describe workplace changes



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made during the past year. Participants documented that training resulted in actions to protect them from hazardous exposures. Specific events where training was used and where actions were taken to improve health and safety represent Kirkpatrick Levels III and IV applications of training. Collecting similar data may be useful to others wishing to identify impacts of training and can be integrated into routine program assessment

**Salguero-Caparros F, Pardo-Ferreira MC, Martinez-Rojas M, and Rubio-Romero JC. Management of legal compliance in occupational health and safety. A literature review. Safety Science. 2020; 121:111-118.**

<https://doi.org/10.1016/j.ssci.2019.08.033>

**Troelstra SA, Straker L, Harris M, Brown S, van der Beek AJ, and Coenen P. Multimorbidity is common among young workers and related to increased work absenteeism and presenteeism: results from the population-based Raine Study cohort. Scandinavian Journal of Work, Environmental & Health. 2019; [epub ahead of print].**

<https://doi.org/10.5271/sjweh.3858>

Abstract: Objectives This study aimed to determine the extent of both multimorbidity and work productivity loss among young adults with paid work and to analyze their association. Methods We included 604 participants from a follow-up of the Raine Study that comprised a cohort who were 22 years at the time (Gen2-22). Information on 36 health conditions, grouped into 10 condition categories, was collected through questionnaires and physical assessments (for body mass index only). Quarterly questionnaires about work productivity, including total absenteeism, sickness absenteeism, and total presenteeism, were distributed electronically over the subsequent 12 months. Descriptive statistics were used to determine the prevalence of health conditions, condition categories, multimorbidity, and work productivity. Zero-inflated negative binomial regression analyses were used to assess the association of multimorbidity with productivity loss. Results Multimorbidity prevalence was substantially higher in females (63%) compared to males (41%). Productivity loss increased as the number of condition categories increased. For example, total absenteeism was associated with an increase in the

number of health condition categories in males [incidence rate ratio (IRR) 1.20, 95% confidence interval (CI) 1.05-1.36] and females (IRR 1.13, 95% CI 1.04-1.24). Similar results were found for sickness absenteeism and presenteeism. The highest burden of productivity loss was found for musculoskeletal disorders (42 444 hours/1000 workers/year), sleep problems (33 581 hours/1000 workers/year), mental and neurological conditions (15 650 hours/1000 workers/year), and 'other' medical conditions (22 519 hours/1000 workers/year). Conclusions Multimorbidity appears to be highly prevalent among young adults with paid work and is strongly related to work productivity loss. Therefore, young workers should be targeted in interventions aiming to reduce multimorbidity and its impact on work productivity

